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The Medical Approach to the Problems of Aging

ROBERT A. MOORE

THIS PAPER WAS PRESENTED AT THE ANNUAL SCIENTIFIC MEETING OF THE GERONTOLOGICAL SOCIETY, INC. ON INVITATION OF THE PROGRAM COMMITTEE AS A PART OF A SYMPOSIUM ON THE SCIENTIFIC APPROACHES TO THE PROBLEMS OF AGING. DR. MOORE DISCUSSES THE NECESSITY OF INCREASING THE NUMBER OF RESEARCH WORKERS IN GERONTOLOGY AND THE NUMBER OF PHYSICIANS AND HOSPITALS TO CARE FOR AND TO REHABILITATE THE ELDERLY. HE SUGGESTS MORE EMPHASIS BE PLACED ON GERONTOLOGY IN A PHYSICIAN'S UNDERGRADUATE YEARS AND THAT PLANS BE MADE FOR RESIDENCY TRAINING IN THE SUBSPECIALTIES OF GERIATRICS AND FOR CONTINUATION EDUCATION.

THE medical approach to the problems of aging is a broad subject and one on which as many different papers could be presented as there are people interested in it. The content of any presentation depends on the thinking and point of view of the author. I shall deal in general rather than in specific terms.

Before proceeding to the individual items of medical education, medical care, and research, let us consider the question of why there is a need at all to discuss the medical approach to the problems of aging.

THE PROBLEM

It is quite unnecessary to detail here why the medical problems of gerontology are significant. Briefly stated the problem is—the better medical care and the improved standard of living in the last fifty years have raised life expectancy from just above 40 to almost 70 years and thus caused a relative increase in the older segment of the population.

There is, however, one aspect of the broad problem which is not generally recognized. Although life expectancy at birth has been greatly increased, life expectancy at 60 has been increased by only three days. Undoubtedly further progress along the same lines is possible, but it is also clear that major gains are possible only along a new front. It is necessary to learn as much about hypertension, cancer, and the degenerative diseases as we have learned about the infectious diseases.

UNDERGRADUATE MEDICAL EDUCATION

In considering any aspect of undergraduate medical education, the basic objectives of this part of the education of the physician must first be defined.

The primary objective of undergraduate medical education is to create opportunities for young men and women to acquire certain points of view and learn certain facts which should be a part of the knowledge of every

Dr. Moore received his A.B. degree in 1921, his M.S. in 1927, and his M.D. in 1928 from Ohio State University. He was a Hanna fellow at Western Reserve 1928 to 1930 and received his Ph.D. there in 1930. In 1931 and 1932 he was a National research fellow in Vienna and upon his return became assistant professor of pathology at Cornell and associate professor 1938 to 1939. In 1939 Dr. Moore became professor of pathology in the Washington University School of Medicine and Dean of the School of Medicine in 1947.

He is secretary of the American Board of Pathology, a member of the Society for Experimental Pathology, the Association for Pathologists and Bacteriologists, the Harvey Society, the International Association of Medical Museums, the International Association of Geographic Pathology, and the Gerontological Society. Dr. Moore's chief interests are pathology and gerontology.

physician, whether surgeon, internist, pediatrician, or general practitioner. These viewpoints and facts are learned largely by seeing and doing, not by hearing. In other words medicine is a subject which is learned, not taught; a subject which uses the laboratory method rather than the lecture method. Also, it follows that undergraduate medical education is not concerned with the training of specialists.

Geriatrics is a specialty and therefore does not deserve recognition as a separate curricular subject. However, an appreciation of the problems of gerontology and a knowledge of some facts of the reaction of aging protoplasm to injury should be a part of the basic information of every physician. That many older persons have a diabetic type of glucose tolerance curve, that the patient who is 80 may not have leukocytosis or fever with acute appendicitis, that the repair of tissue following operation or injury proceeds more slowly, and that both the neonatal and maternal death rates are higher in older women with pregnancy, are essential facts for every physician.

This and other similar knowledge should be learned in connection with biochemistry, pathology, surgery, and obstetrics, rather than in a separate course sometime in the four years of medical school.

Thus, in summary, undergraduate medical education is concerned with gerontology, not with geriatrics. Expressed in another way, this phase of medical education should be kept as close to biology as possible.

Postgraduate Medical Education

With the two succeeding phases of the education of the physician, postgraduate and continuation, the approach must be somewhat different.

Postgraduate medical education of the house-officer type is essentially specialty training, and the general practitioner should be as much a specialist as is the surgeon, or internist. The term should not include all physicians who are not specialists by present definitions.

If medical practice of the future is to take into account a large segment of older patients, then the training of physicians who have a special knowledge of the problems of disease in the older person should be begun now.

The initial reaction to the establishment of geriatrics as a specialty is to create residencies in geriatrics in certain hospitals and perhaps even to organize a board of geriatrics similar to the other fifteen specialty boards. The proponents of such a plan compare geriatrics with pediatrics. However, the comparison is not valid because the pediatrician is not one who looks after all disease in children. He is in fact an internist specializing in children's diseases. Recently it has been clearly demonstrated that surgical care is far better if a surgeon specializes in children's diseases.

With this point of view geriatrics is a subspeciality of many other specialties of medicine and not a specialty in itself. If this conclusion be correct, then the program of the training of the future geriatrician is fairly clear. There are two phases of training, first in a major specialty, and second in the geri-

atric subspecialty. It is to be hoped that the same mistake that has been made and is now being made in others which should be subspecialties will not be followed in geriatrics.

The sick human being has been divided already into too many small parts for his own good. The geriatric surgeon should first be a general surgeon, and the geriatric internist should first be a good general internist.

All of this means that there should be established residencies, not in geriatrics, but in geriatric internal medicine, in geriatric psychiatry, in geriatric surgery, etc. Young physicians appointed to these posts should have at least two or three years of training in the broad specialty, which would then be complemented by two or three years of training in the restricted specialty.

It also means that there should not be a separate American Board of Geriatrics, but that as men are trained the present boards of internal medicine, surgery, and psychiatry should be encouraged to sponsor subboards.

Finally, on this topic of postgraduate medical education there is continuation education. Even if specialization in geriatrics reaches full flower in the next twenty years there will not be enough physicians to care for all the older patients; most will still go to the general practitioner or to other specialists.

Those charged with education must therefore concern themselves with providing educational opportunities on a continuation or refresher basis. One-day, two-day, and week-long refresher courses should be planned. But if these are for general practitioners they should be pitched at a general level. A specialist or subspecialist cannot be made with continuation courses. The primary objective of the continuation course is to provide information on the new, not to supply the basic training.

Medical Care

The future of medical care in the United States is so confused at the moment that anyone who speaks about it is assuming the role of a major prophet. For example, President Truman has called for enactment of a bill for compulsory health insurance covering 125,000,000 persons. The impact of this, if it materializes, will far exceed the influence of the changing age of our population.

However, some things are clear. Two of the more important are the incidence and the duration of illness in older people.

According to figures of the United States Public Health Service, the average duration of disabling illness in the population at large is about five days. But, in individuals over 60 the average duration is about thirty days, or six times as long.

As the proportion of the population over 60 increases, so the need for man hours of a physician's care increases in almost geometric, not arithmetic ratio. This is the most important fact in a consideration of whether or not the number of graduates from schools of medicine should be increased. The need for physicians for the armed forces, for public health posts, for greater demand by the public, are really infinitesimally small as compared to the need for the care of the increasing older population.

The older person becomes ill oftener and remains ill longer than does the younger individual.

Rehabilitation and Vocational Guidance

Although physical medicine and rehabilitation constitute a part of medical care, the problems are of such magnitude as to make it desirable to separate them in this survey.

It is on the topic of rehabilitation that the medical man must join forces with the industrialist, the economist, and the sociologist in solving the problems. It is also in this field that the physician interested in disease in older persons is on common ground with the physician who has focused his attention on chronic disabling disease.

Briefly and bluntly stated, the question is: How many people can be taken out of productive life by age and disabling illness and not endanger our economic structure?

The incidence of disabling illness starts to rise at age 30 to 35 and assumes an increase which is logarithmic. Today the young productive worker has on his back an average of two and one-half members of his family, the unemployables, the chronic invalids, and the retired oldsters. An increase in the older group, even on an insurance basis of social security, may be the straw that breaks the camel's back.

Our approach to this problem must be twofold—research on the prevention and cure of disabling disease and rehabilitation of those disabled.

The emergence of physical medicine as a specialty of medicine has been greatly accelerated by the experiences of the recent war. When supported by physical therapy, occupational therapy, and vocational guidance, the physiatrist can do wonders in shortening the duration of illness and absence from work and in placing disabled individuals back at work.

We must change our viewpoint from that of what capacity has the disabled or older person lost to that of what capacity has the disabled or older person retained which can be utilized.

The Social Problems

There is also a humanitarian and social side to the problems of rehabilitation. In the United States during the nineteenth century a program of care for the indigent unemployable and older part of the population was evolved—the county poor farm. This solution followed the same pattern as that developed for the mentally ill and the criminally inclined. The general thesis was to institutionalize them, separate them from all social and economic contacts with the world, and provide medical care only for acute illness.

Gradually this concept is being replaced by one which is based on the thesis that institutionalization is only a temporary phase in the treatment and care of these individuals. The older person and the invalid are not to be segregated and denied the stimulation of social contacts. With cooperative effort of the social worker, the clinical psychologist, and the educator, avocations can be developed which will give the person peace of mind and mental satisfaction.

Hospitalization

Closely related to the medical care and social problems of the aged and disabled is the provision of hospitalization for these individuals.

The figures for the Borough of Manhattan of New York City will serve to illustrate this point. While the population of the borough has decreased as a whole and increased slightly in those over 60, the admissions to the Bellevue Hospital of those over 50 have increased relatively much more.

Just as illness in the aged will require more physicians, so the need for hospitalization of these ill older persons will be an important factor in the need for more hospital beds.

Research

From what has been proposed in the preceding sections it is apparent that research must play an important part in the future of gerontology and geriatrics. There are two broad questions for which we should seek answers—why does protoplasm age and what can we do to prevent it, and what is the nature, cause, treatment, and prevention of those diseases most frequently observed in the older person.

There is no sharp distinction between preclinical and clinical, or between basic and applied research, but in planning a problem attention must be focused on some specific objective.

What is needed for this research? Basically three things—men, facilities, and money —in that order of priority.

The primary ingredient of the recipe for research is a man or woman who is interested and who has an original mind. Fortunately the number of these individuals interested in gerontology in the United States is increasing, but not at the needed velocity. It is also

necessary to place this individual in an atmosphere where the inquiring mind will receive constant stimulation. Again, fortunately centers of research in gerontology are being developed in the United States. These can be established as autonomous research institutes or integrated into the activities of a larger institution such as a university or school of medicine.

Both procedures have yielded results in the past and will in the future. However, within a school of medicine integration is the better method. To establish autonomous research institutes within a school defeats the very purpose for creating the school—to permit cross fertilization between the younger and the more mature mind, and between minds with different points of view and approaches.

The second and third ingredients of research—facilities and money—may well be discussed together. In the early part of this century, gifts to universities and research institutes were largely for buildings and by individuals. The donor wished to have something tangible; something that could be seen. This tendency reached such large proportions that universities had to adopt a new policy—no gifts can be accepted for a building unless sufficient is added to provide for the maintenance and use of the building.

Gradually the source of money for research has changed and the philosophy of the grantors is altered. Today there are funds for research, but little space in which to do it. Certainly there is no space in which to undertake new major programs on a long term basis.

From this aspect, those who are planning to raise money to expand research should be urged to consider three uses of the money—first to pay those who do the research an adequate salary; second, to pay for the supplies and equipment needed; and third, to build physical facilities.

Summary

1. Undergraduate medical education should be reoriented but not reorganized to permit increasing emphasis on gerontology.

2. Plans should be developed for residency training in the subspecialties of geriatrics and for continuation education of physicians.

3. The need for greater medical care by the increasing older population is the most important reason for the education of more physicians and erection of more hospitals.

4. More disabled and older persons must be rehabilitated for productive work and social intercourse if our present economic and social structure is to survive.

5. There must be a vigorous prosecution of research in gerontology.

Submitted for publication January 8, 1949

The author's address is:

Dr. Robert A. Moore

Department of Pathology

Washington University School of Medicine

St. Louis 10, Missouri

Age Changes in the Salivary Glands of Wistar Institute Rats with Particular Reference to the Submandibular Glands

WARREN ANDREW

THIS PAPER WAS PRESENTED AT THE FIRST ANNUAL SCIENTIFIC MEETING OF THE GERONTOLOGICAL SOCIETY, INC. ON INVITATION OF THE PROGRAM COMMITTEE AS PART OF A SYMPOSIUM ON THE BIOCHEMISTRY AND PHYSIOLOGY OF THE AGING PROCESS. IN AN INVESTIGATION USING 58 WISTAR INSTITUTE RATS OF VARIOUS AGES, DR. ANDREW FOUND THAT ALMOST NO FATTY DEGENERATION OF THE SUBMANDIBULAR GLANDS OCCURS WITH AGE IN THE RAT. THIS FINDING IS IN CONTRAST TO THE DEGENERATIVE PROCESSES WHICH TAKE PLACE WITH AGE IN THE PAROTID GLANDS.

FEW studies on age changes in the salivary glands have been made. In a previous article (1) dealing with such changes in the parotid gland, I reviewed in more detail the rather scanty literature on the subject. In my own work, I found a much more marked degenerative process in the parotid glands of Wistar Institute rats in old age than had been suggested by any earlier authors. The process appears to be one of fatty degeneration, which occurs in such a way as to leave numerous small islands of parenchyma surrounded by adipose tissue.

Goodpasture (4) had described shrinkage and pycnosis of the nuclei in the ducts of salivary glands of old dogs. Hamperl (5, 6) described a peculiar cell type in the salivary glands of aged human beings. These cells, which he designated oncocytes, are characterized by a large cell body, generally lightly staining and often granular cytoplasm, and nuclear changes, including, according to Hamperl, amitotic division of the nucleus which leads to the binucleate condition and even to cell proliferation.

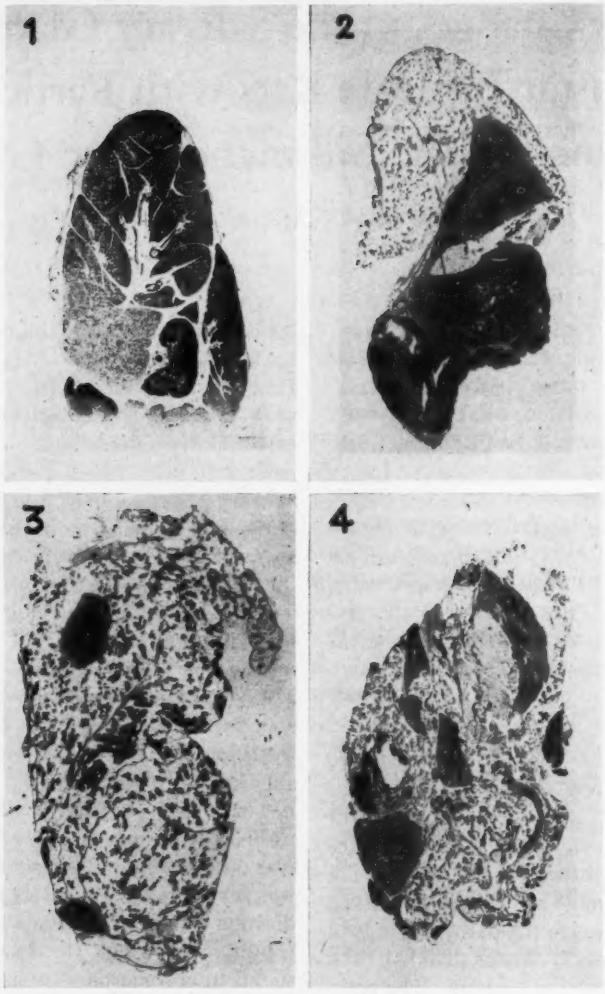
Veratti (11) found peculiar cells in the salivary glands of dogs, the ages of which he knew only as being more than one year. He spoke of these cells as pycnocytes and thought that Hamperl had wrongly interpreted elongated, degenerating nuclei as figures of amitotic division.

I found numerous cells in the parotid glands of senile rats which seemed to correspond well to the oncocytes described in man by Hamperl. In these large cells the nuclei vary much in appearance. Many of them, however, are vesicular, with hypertrophied nucleoli, while others are pycnotic with irregular outlines. In both types amitotic division was seen. In some nuclei a peculiar internal division occurs which leads to a multilobular condition in which the lobules may correspond to chromosomal vesicles or groups of such vesicles.

In the present investigation I have been concerned primarily with the submandibular gland. In the report of the findings a comparison with the changes previously observed in the parotid gland will, however, be included.

MATERIALS AND METHODS

The submandibular glands of 58 Wistar Institute rats were used in this study. Of



Figures 1 to 11 are from 7 μ sections stained with Harris' hematoxylin and eosin.

1. Sagittal section of an entire parotid gland typical of a 200 day rat. The interlobular connective tissue is small in amount and the glandular tissue is intact. x 4

2. Sagittal section of an entire parotid gland of a 700 day female Albino rat. A large proportion of the glandular tissue has been transformed into isolated fragments. x 4

3. Parotid gland of another 700 day female Albino rat. An extreme degree of fatty degeneration has occurred. x 4

4. Parotid gland of a 1000 day female Albino. Fatty degeneration is marked, but large islands of relatively intact tissue remain. It is in such areas that the oncocytic change frequently is conspicuous. x 4

Dr. Andrew received his Ph.D. degree in 1936 as a result of graduate work in the zoologic sciences at Brown University, Yale University, and the University of Illinois, and his M.D. degree in 1943 from Baylor Medical College. From 1936 to 1947 he was connected with the Department of Anatomy at the University of Georgia Medical School, Baylor Medical College, and the Southwestern Medical Foundation. Since September, 1947, he has served as Professor of Anatomy and Chairman of the Department at the George Washington University, Washington, D.C. Dr. Andrew has served as Visiting Professor to the University of Montevideo, Uruguay (1945) and as Visiting Professor of Anatomy at Washington University (September, 1948, to March, 1949), collaborating in research with Dr. E. V. Cowdry. He has written a number of papers, chiefly on histologic and cytologic changes with age.

these, 9 were 21 days, 14 were 50 to 150 days, 5 were 200 days, 7 were 300 days, 4 were 400 to 550 days, and 19 were 700 to 1170 days of age. In general the 21 day rats may be designated as immature (group I), the 50 to 150 as young (group II), the 200 to 550 (group III), as middle-aged and the 700 to 1170 (group IV), as senile. Thirty-four of the animals were males, 24 females, the two sexes being fairly evenly distributed among the age groups.

One of the animals in group III, a 550 day male, was a Gray Norway rat and 9 of the senile rats were of this strain. All of the other animals were Albinos. No difference in structure nor in type of age change has been noted in the two strains.

The rats were sacrificed by etherization at the Wistar Institute. All of them were killed in the morning, at 9:30 or at 11:00 A.M. At this time of day the rats generally are sleeping or at least inactive. Food was available twenty-four hours a day.

The glands were fixed in Bouin's fluid, from which they were transferred to 80 per cent alcohol for shipping to my laboratory. Necropsy notes for each animal accompanied the specimen.

Dehydration and infiltration was carried out in an autotechnicon to help to insure uniformity in treatment. The organs were embedded in paraffin and sections cut at 7 μ.

Eight slides were prepared from each gland, a number of sections being put on each slide. In general, sections from near the center of the gland, those with the largest area of tissue, were mounted.

For staining, the slides from each gland were divided into 3 groups. The first group (4 slides) was stained with Harris' hematoxylin and eosin, the second (2 slides) with Mallory's aniline blue connective tissue stain, and a third group (also 2 slides) with Heidenhain's iron hematoxylin and a counterstain, either eosin or Orange G.

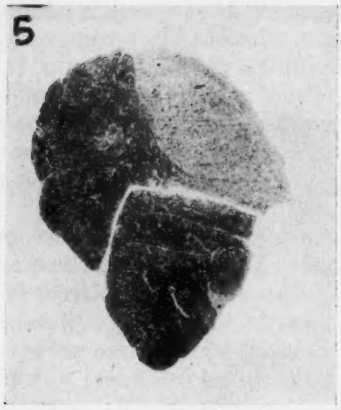
The manner of preparation was designed to give an adequate histologic picture of the organ. No attempt to determine phases in the secretory activity of the cells nor minute and relatively transient physiologic differences was made.

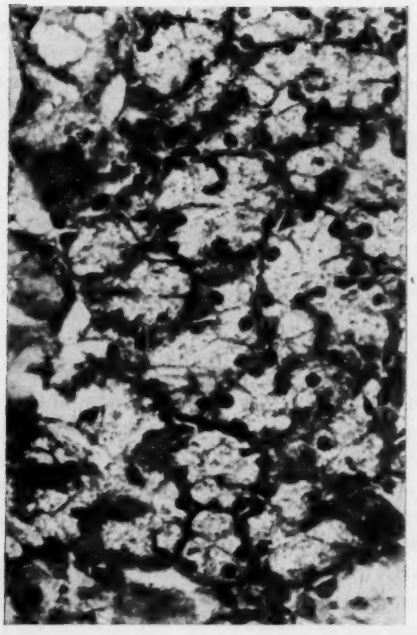
Observations were carried out with low power (100 diameters), high dry power (430 diameters), and with the oil immersion lens (970 diameters).

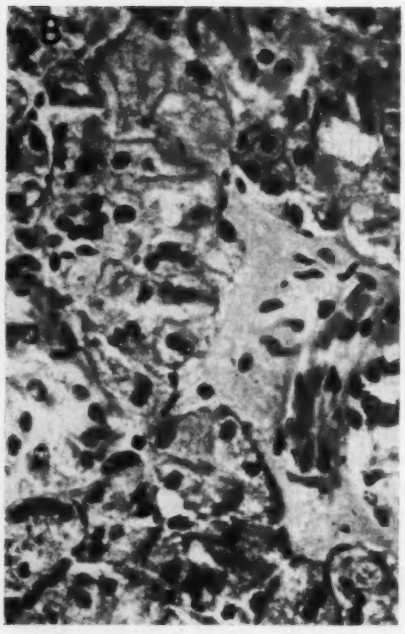
Observations

The structure of the submandibular gland of the rat differs from that of man in that the serous and mucous alveoli are in distinct portions of the gland, all of the lobules with serous alveoli being in one portion, those with mucous in the other. These portions are, however, in close contact (figs. 5 and 6). In both the serous and mucous portions the salivary ducts, as seen in section, are numerous and conspicuous. In the mucous portion they generally show a very well-defined lumen and few indications of secretion by their cells. In the serous portions the cells of the ducts usually show evidence of secretory activity. They contain many secretion granules, and the lumen, particularly in older animals, frequently is poorly outlined or completely filled.

The characteristics of the glands at given ages are consistent enough that their appear-







5. Section of entire submandibular gland of a 300 day old female Albino rat. The upper right portion consists of mucous alveoli, all of the remainder of serous alveoli with many salivary ducts (more lightly stained). x 6.5

6. Section of entire submandibular gland of a 1000 day male Albino rat. Upper right portion is mucous in character, the remainder serous. No fatty degeneration. (Compare with figs. 2, 3, and 4, of senile parotid gland). x 6.5

7. Serous alveoli of a 200 day male Albino rat. The nuclei are uniform in size and shape. x 395

8. Serous alveoli of a 1000 day male Albino rat. The nuclei vary in size and shape. Many double and some triple nuclei are seen. x 395

Magnification of figures is x 1600.

ance according to the age groups previously mentioned can be described.

In group I, the immature rats, the cells of the serous alveoli show a rather densely basophilic cytoplasm in their basal portions, extending generally as far apically as the apical pole of the nucleus. The rest of the cell is very lightly basophilic. Each nucleus generally contains one or two prominent nucleoli from which linin threads run to the nuclear membrane. The staining properties of the nucleus are different from those in the parotid gland at this age, the entire structure being darker and this characteristic difference continues into the middle-aged and older animals.

The striated ducts show a well defined lumen in each case and parallel striations in the basal portion of each cell. The cytoplasm is lightly eosinophilic. The nuclei usually are located about the center of the cell. The secretory portions of the ducts show a granular, deeply eosinophilic cytoplasm, and a more poorly outlined lumen, although the presence of a lumen usually is obvious.

The nuclei of the ducts are more lightly stained than those in the serous alveoli. Mitotic figures are numerous in the alveoli of the gland at this age. The cells containing them usually show a very lightly basophilic or almost clear cytoplasm. Mitoses seem relatively infrequent in the cells of the salivary ducts.

A noteworthy difference between the parotid and submandibular glands of the immature rat is the presence in the former of large amounts of interstitial tissue between the lobes and lobules, largely immature adipose in type, while in the latter such interstitial tissue is almost entirely lacking.

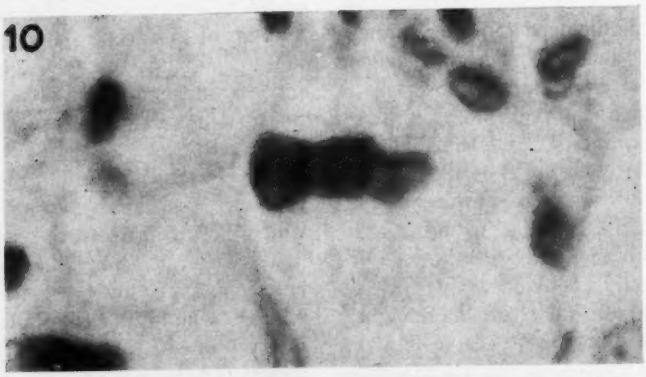
In group II, the 50 to 150 day rats, the chief changes noted are the decrease in number of mitotic figures and the loss of basophilia of portions of the cytoplasm in the body decreases so that in animals of 100 days alveoli. The basophilic portion of the cell and over it is generally a narrow strip entirely basal to the nucleus.

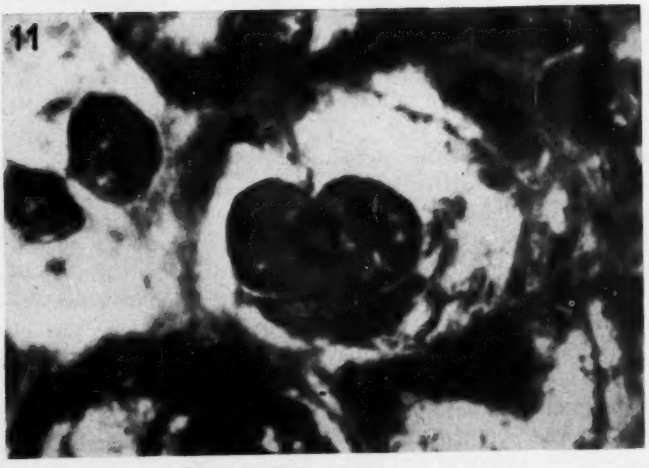
In group III, the 200 to 550 day animals, one finds a general uniformity in the histologic picture, with, however, some definite variations. The most conspicuous change seen when the older animals of this group are compared with the younger are in the salivary ducts, particularly in their granular, nonstriated portions. Here the number of ducts showing a lumen becomes progressively smaller, and the nuclei of many cells in the ducts appear shrunken and pycnotic, often placed at the very base of the cell. In the older animals of this middle-aged group a moderate amount of lymphocytic infiltration of the ducts is seen. The serous alveoli in animals of this group show generally spheroidal nuclei with the characteristics described for the younger animals. The basophilic cytoplasm remains as a narrow strip at the base of the cell.

In animals of group IV, those of 700 days and over, the glands present an appearance which distinguishes them readily from those of younger rats. The difference, however, is not seen at very low powers (compare figs. 5 and 6). The lobes and lobules of the glands in every one of the 19 senile animals appear intact. There is not even a beginning of the destructive process of fatty degeneration seen in the parotid gland (figs. 2, 3, and 4).

At a magnification of 100 diameters, however, and still better in the neighborhood of 400 diameters, the distinction between the serous alveoli of the young and middle-aged animals is very sharp (figs. 7 and 8). The serous cells of the senile glands include many of large size and the nuclear size and shape are remarkably variable. Some nuclei are very large, well over twice the volume of the ordinary run, some are elongated or angulated, and many are obviously double, or even triple.

The great variety in size and shape of the nuclei and the increased size of the cell body appear to be constant characteristics of senility. The glands of the different senile rats, and in fact different areas of the glands, vary considerably in the degree of change and it does not seem practicable to give a quantita-





9. A binucleate oncocyte from the submandibular gland of a 700 day male Albino rat. The manner in which daughter nuclei, arising by amitosis, tend to adhere is seen here.

10. A chain of 3 adherent "nuclei" in an oncocyte of the submandibular gland of a 1000 day male Albino rat. A nucleolus is present in each nucleus.

11. A binucleate oncocyte from a 700 day female Albino rat. Two features of common, but not constant occurrence, in oncocytes seen here are the great hypertrophy of the nucleoli and a strong development of ergastoplasm in the vicinity of the nucleus.

tive description. One fact, however, is of considerable interest. The most marked nuclear abberation occurs in areas closest to connective tissue masses, as in proximity to the capsule or to interlobular septa.

That the large cells with aberrant nuclei represent the same cells described in man (6) and in the parotid gland of the rat (1) as oncocytes, there can be no question. On the other hand, I would like to stress the fact that all stages of transition between them and the ordinary serous cells are seen and that perhaps the best definition of an oncocyte in many of the glands would be simply "the largest and most aberrant of the cells of the serous alveoli."

While many of the oncocytic nuclei are stained so deeply as not to permit one to distinguish structure, others are vesicular and show very prominent, hypertrophied nucleoli. Figures indicative of amitotic division are common.

An interesting feature is the tendency of nuclei to adhere to each other, apparently after division by amitosis. In this manner, twin nuclei in close contact are formed (fig. 9). It seems that at least one member of such a pair may undergo division again, for triple nuclei also are found (fig. 10).

The cytoplasm of the aberrant cells is generally lightly basophilic. It bears a different relationship, however, to that of the cytoplasm of the ordinary serous cells than is the case in the parotid. In the submandibular gland the basophilia of the general run of serous cells is very slight, so that the oncocytic cells often show more deeply staining bodies than their more normal neighbors, whereas in the parotid gland they stand out by the relative lightness of their cytoplasmic stain.

In the mucous sections of the gland I have been unable to trace any oncocytic change. The general appearance of this portion varies little from one group of animals to another and the variation in nuclei seems related only to the stages of secretory change.

The salivary ducts of senile animals show a continuation and accentuation of the changes seen in some of the older middle-aged rats. The nuclei are shrunken and pycnotic in many cells and flattened against the basement membrane. The lumina of practically all of the ducts with granular cells are now completely obscured. Lymphocyte infiltration is pronounced in many instances.

We have found no calculi in the lumina of the ducts of the submandibular gland and very little material which could be considered cellular débris, except for occasional lymphocytes.

Discussion

A number of the features of the submandibular gland of the rat mentioned in this paper have been described by other authors. Tupa (10) points out that it is a peculiarity of rodents to show great numbers of tubules (salivary ducts) with very abundant granules and that this is not true for man, dog, cat, pig, sheep, or other animals. The great area occupied by these ducts in section is seen in figures 5 and 6 where they stand out as light-staining structures among the dark serous alveoli. The light areas in these figures include the striated portions of the ducts, but the latter are much less extensive than the granular portions.

While these granular salivary ducts show definite changes with age, I have almost never seen cells in them which would be classified as oncocytes. Hamperl (5) has described oncocytes as arising from cells of ducts or of serous or mucous alveoli. In the rat they appear to arise almost entirely from cells of serous alveoli. I have not seen oncocytes in the mucous portion of the gland, but have seen perhaps one or two cells of ducts which might be called oncocytic out of the great many thousands studied.

An interesting characteristic of the submandibular gland which has been described by several authors, including Raynaud (9), is the presence of a sexual difference in the degree of development of the granular sali-

vary ducts in certain rodents. In the male mouse these contain abundant granules and are very well developed even when the animal is only a few months old. In the female of two or three months they are considerably narrower and are poor in granules but rich in striated protoplasm. In other words, the striated segment of the duct appears to retain its own characteristics longer in the female, while it becomes granular at an early age in the male. Raynaud described in the female the approach to the male condition of the salivary ducts in older animals (1 to 2 years). There is hypertrophy as well as extension and ramification of the tubules. The cells lose their striations and become filled with granules.

I have looked for these sexual differences with some care but they do not appear, or at least not as clear-cut histologic differences, in this series of animals. In both the 21 day males and females the granular portions of the ducts already are very extensive, occupying about as great an area in section as do the serous alveoli. The sections of striated ducts are much less numerous and extensive and this relation continues to exist in old rats.

In the senile animals of both sexes the characteristics are as given in our general description and no sexual differences were seen.

Sex differences in the submandibular gland of the mouse, however, seem to have been well established, both morphologically and experimentally (3, 7). Chaulin-Servinière says that in the male mouse the striated portions become more and more rare even in early life and that at about 60 days they disappear completely. In the rat, I have seen fairly well-marked striations in many sections of tubules in males of 1000 days of age. Bakaloff (2) studied male and female puppies and found practically no differences in the glands. He considered this lack of difference due probably to the youth of the animals. It seems probable that a species difference exists in the degree of sexual variation of the submandibular gland.

The lack of fatty degeneration in the submandibular gland of the rat in old age is rather surprising when we consider the marked process of this type in the parotid glands of the same animals. It is true that an occasional adipose cell is seen in the lobules of aged rats but they are rare and no frankly degenerating parenchyma has been seen. The serous cells of the submandibular gland are definitely of different type from those of the parotid, as seen from the descriptions in this paper and in those of Ziegler (12) and of Zimmerman (13). Whether this cellular difference is accompanied by a greater resistance to fatty degeneration, whether the presence of a better defined capsule helps to protect the gland in some way, or whether some other cause is operating, I cannot say.

The lack of fatty degeneration, however, is of particular interest when it is considered that the oncocytes in the senile submandibular gland are as numerous and as conspicuous as in the senile parotid gland. In the latter, I have pointed out (1) that they usually are found in the large areas of almost intact parenchyma. In both types of gland, then, they appear not to be associated with the process of fatty degeneration, at least not in any direct manner.

The general features of the oncocytes or aberrant cells in the submandibular gland seem similar to those in the parotid. The tendency of the nuclei to adhere together does seem more striking in the submandibular gland, however. Lewis (8) has described amitotic division in tissue in which the resulting daughter nuclei failed to separate. He says (p. 438): "Such a condition can be explained by loss or partial loss of adhesion between vesicles better than by a constriction band." I, too, believe that amitosis may occur by an internal change in the adhesiveness of groups of vesicles without an actual constriction, yet it seems probable that nucleolar division also must occur,

as the majority of the nuclei of oncocytes contain but one nucleolus (fig. 11).

Senile change in the submandibular gland of the rat, while not accompanied by any marked cell destruction, leads to an histological picture markedly different from that seen in younger and middle-aged animals.

Summary

1. The submandibular gland of Wistar Institute rats has been studied in a series of animals ranging from 21 days to 1170 days of age.

2. In old age there is almost no fatty degeneration in this gland in the rat. This is in contrast to the condition in the parotid glands of the same animals, where large masses of parenchyma are destroyed by such a process.

3. Oncocytes are as numerous and as conspicuous in the senile submandibular gland as in the senile parotid gland. They are essentially large, aberrant cells of the serous alveoli, which show marked nuclear changes.

4. The nucleoli of oncocytes are hypertrophied. Amitosis is common and the daughter nuclei tend to adhere together, forming twin and triplet nuclei.

5. With increasing age, the granular parts of the salivary ducts show more pycnotic and shrunken nuclei, the lumina are obscured, and infiltration by lymphocytes is common.

This study was supported by a grant from the National Cancer Institute for a comparison of cytologic changes in old age with those in the development of tumors. The work was carried out at the George Washington University, Washington, D.C., and at Washington University, St. Louis, Missouri, where Dr. Andrew was serving as Visiting Professor in Anatomy.

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The author's address is:
Dr. Warren Andrew
Department of Anatomy
The George Washington University Medical School
Washington 7, D. C.

The Direct Effect of Steroids on the Senile Human Skin

A Preliminary Report

JOSEPH W. GOLDZIEHER

THIS PAPER WAS PRESENTED AT THE FIRST ANNUAL SCIENTIFIC MEETING OF THE GERONTOLOGICAL SOCIETY, INC. ON INVITATION OF THE PROGRAM COMMITTEE AS A PART OF A SYMPOSIUM ON THE BIOCHEMISTRY AND PHYSIOLOGY OF THE AGING PROCESS. REGENERATION OF SENILE HUMAN SKIN CAN BE EFFECTED BY THE TOPICAL APPLICATION OF SEX HORMONES DR. J. GOLDZIEHER HAS FOUND. USING ESTROGEN IN AN OINTMENT BASE THE SKIN OF THE SENILE WOMEN SHOWED REGENERATION WHEREAS THAT OF THE SENILE MEN DID NOT. HOWEVER, BIOPSIES SHOWED THAT WHEN EITHER ANDROGEN OR ESTROGEN WAS SPRAYED ON THE SKIN IN SUFFICIENT CONCENTRATIONS REGENERATION OF THE SKIN OCCURRED REGARDLESS OF SEX.

THE changes which occur in the skin of man during the course of aging are well known. Dr. Max A. Goldzieher and I have been interested for some time in the possibility that endocrine and/or metabolic factors play a role in this process, and our studies at the present time have been directed chiefly toward the steroid hormones.

The effect of steroids, particularly androgens and estrogens, on the integumentary structures of experimental animals has been studied in some detail, for instance on feathers (1), sebaceous glands (6), the capon's comb (3), the skin of hairless rodents (7, 8), etc. Our knowledge of human skin, by contrast, is highly fragmentary, and it is only very recently that studies of the gerontologic aspects of skin physiology, such as those of Kirk (5), have appeared.

One of the reasons for such paucity is the fact that parenteral administration of steroids — estrogen, for instance — in doses giving an adequate concentration at the intended site of action causes side-effects which are prohibitive in man. For this reason we have used the technique of direct application to the skin surface, achieving in this way a local concentration of steroid not obtainable otherwise, and an absence of undesirable systemic reactions.
That the skin is pervious to steroids applied in this way has been demonstrated repeatedly.

The first study of this problem, using natural estrogens on the skin of five females, was reported in April, 1946 (4). Following this, it was decided to study the observed effect in greater detail and on a larger group of subjects. For this purpose 32 aged (26 female and 6 male) and 4 young female patients were selected at another institution and divided into groups as shown in table 1.

Groups I, II, III, and V were intended to explore the influence of the ointment base (petrolatum-lanolin or pure petrolatum) as well as the concentration of estrogen (natural estrogen, i.e., chiefly estrone, from 5,000 to 15,000 I. U. per ounce of ointment). Group IV consisted of four young female volunteers aged 17 to 35 whose

Dr. Goldzieher received his A.B. degree from Harvard in 1940 and his M.D. degree at New York University Medical School in 1943. After serving as resident in pathology at the New York City Hospital and resident in endocrinology at Duke Hospital, he became associated with the Departments of Medicine and Research at St. Clare's Hospital, New York, and is also Assistant Attending Physician in Endocrinology at the New York Municipal Sanatorium.

skins were normal clinically and histologically. Hormoneless base or pure petrolatum was used as a control on the contralateral side. Biopsies were taken of both sides at five to ten day intervals by means of a 5 mm. Keyes punch. The tissue was fixed at once in a 1:4 dilution of Bouin's fluid, embedded in paraffin, sectioned, and stained with hematoxylin-eosin, picrocarmine, a modified Levaditi stain for melanin, and Weigert's elastic tissue stain.

The results are shown in table 2. In summary, the findings indicate that:

1. No changes occurred in the normal skin of young females;
2. Senile female skin showed regeneration, senile male skin did not;
3. Maximum response was obtained in forty to fifty days, with no further changes thereafter. No regression was seen within ten days after stopping treatment;
4. Response depended upon the concentration of estrogen;
5. Only minimal changes of the vaginal smear were noted.

At this point the need for a different technique became apparent. It was desirable that the slight changes noticed in the skin of control areas after prolonged application of petrolatum-lanolin be obviated. The need to study the effect of much greater concentrations of estrogen was evident, and finally the results suggested the value of investigating the effect of testosterone by the same technique.

The reagents were now prepared as solutions: a 1 mg./ml. solution of testosterone propionate in ether and an 0.5 mg./ml. solution of estrogen (chiefly estrone) in alcohol-ether. Both solutions contained traces of sesame oil to insure some adherence of the steroid crystals to the skin surface. One ml. of the selected reagent was sprayed with a syringe and a 26-gauge needle onto a marked 5 by 5 cm. area of thigh skin twice daily for a period of 23 to 42 days. Five elderly males

TABLE 1. ESTROGEN. PRELIMINARY STUDIES WITH AN OINTMENT BASE

Group	No. of Patients	Sex	Age		Base	Estrogen Concentration	Control	Duration of treatment (days) vs. no. of patients							Site	No. of Biopsies
			Average	Range				10	20	30	40	50	60	80		
I	14	9 F 5 M	69.5 62.5	51–79 57–66	Oint.	5,000 IU	Oint.	1	1 2				7 2	 1	Back Back	150
II	8	7 F 1 M	67	50–97	Oint.	5,000 IU	Oint.: 3 Petr.: 5			1		1	6		Back: 3 Thigh: 5	74
III	5	F	71	57–86	Oint.	10,000 IU	Petr.		1				4		Thigh	44
IV	4	F	24	17–35	Oint.	5,000 IU	Oint.			3			1		Back	33
V	5	F	66	51–79	Petr.	15,000 IU	—	54 days: 5							Thigh	20
Totals	36															321

and one aged female were treated with testosterone, two males and one female with estrogen. Biopsies were taken every five days except in two cases where only beginning and end biopsies were obtainable.

Very unexpectedly the effect of androgens and estrogens was found to be identical and, furthermore, to be independent of the patient's sex. Biopsies before the onset of treatment showed certain common features (fig. 1, 0 days). The epidermis was thin, epithelial pegs were small or absent, and the cells themselves were small and deeply staining—signs of senile atrophy. No studies were made of the accessory structures such as hair, sebaceous glands, or arrector muscles, because the test site chosen did not afford sufficient numbers of these components for adequate study.

Within five days under androgen spray and within ten days under estrogen spray definite changes of the epidermis were seen (fig. 1, 5 and 10 days). At first there appeared only a slight waviness of the basal layer and an increase in the prominence of the epithelial pegs. Gradually these changes became more pronounced, and after about twenty days of treatment (fig. 1, 20 days) actual thickening of the epidermis became apparent. This developed further during the next ten days of treatment (fig. 1, 30 days) and persisted for at least ten days (fig. 1, 30 + 10 days) after the end of the spray treatment.

Actually, two subtypes of response were noted; in one (fig. 2) there was predominantly an increase in the dimensions of the epithelial pegs, while in the other (fig. 3), thickening of the epidermis was far more pronounced. This is probably just a matter of individual response.

Finer histologic details are shown in fig. 4. In the control biopsy (0 days) the skin averages 4 to 6 cells in thickness. There are relatively few large cells in the uppermost layers; most are compressed and show pyknotic nuclei. In the middle layers the intercellular bridges are rather indistinct and the cells show no evidence of any pattern. The cells of the basal layer are cuboidal, with scanty cytoplasm and irregularly distributed nuclei.

After 30 days of spray treatment (30 days) there are many layers of cells; the epidermis has more than doubled in thickness. The stratum granulosum is very prominent and there are many flattened cells in the upper layers. The cells of the middle layer are larger and their cytoplasm is abundant and the intercellular bridges are

TABLE 2. ESTROGEN. RESULTS OF PRELIMINARY STUDIES

Group	No. in Group	Date of first observed changes (in days)					Date of maximum observed changes (in days)					Total no. showing changes	Effect on elastic tissue	No. cases with vaginal smears	Estrogenic effect on vag. smears			
		10	20	30	40	50	20	30	40	50	60				0	1+	2+	3+
I	8F 4M	1	2	3 1			1	1? 	4		1	6 (83.3%) 1? (25%?)	1 0	7 —	1	3	2	1
II	7F 1M		2	2		1		1		3	1	5 (71.4%) 0 (0.0%)	1 0	6 —	1	3	2	0
III	5	1				1				2		2 (40.0%)	1	4	2	1	1	0
IV	4											0 (0.0%)	0	0				
V	5	1		4				4	1			5 (100%)	2	0				

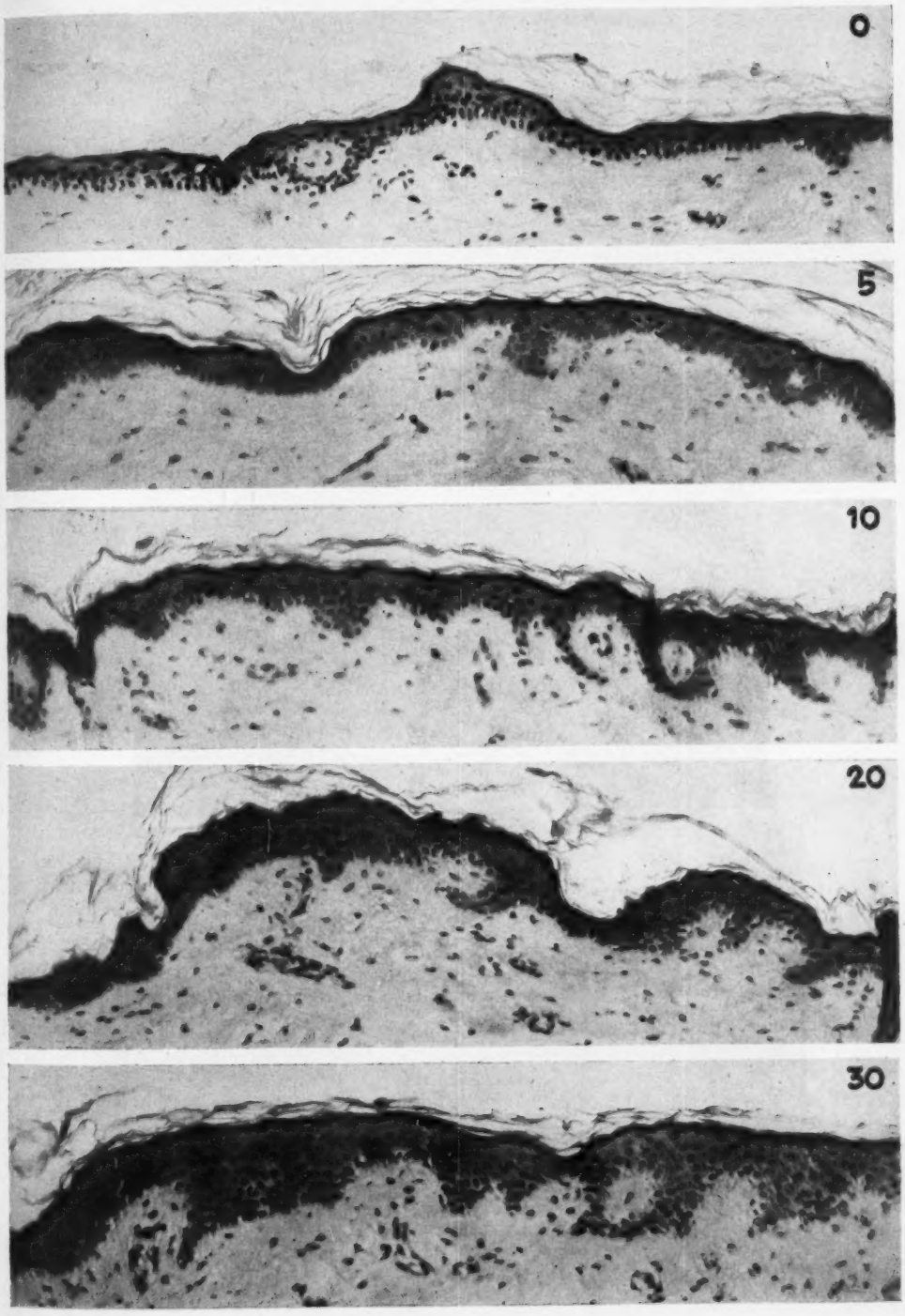

FIGURE 1. See legend next page.

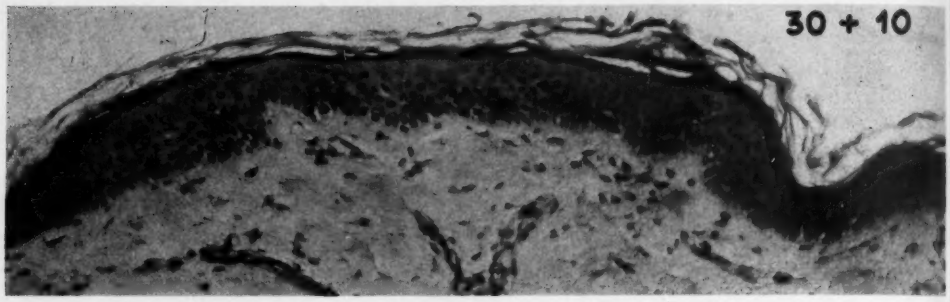

FIG. 1. (Continued) Serial biopsies of the skin of a patient treated with estrogen in the manner described. Hematoxylin–eosin, x 197.

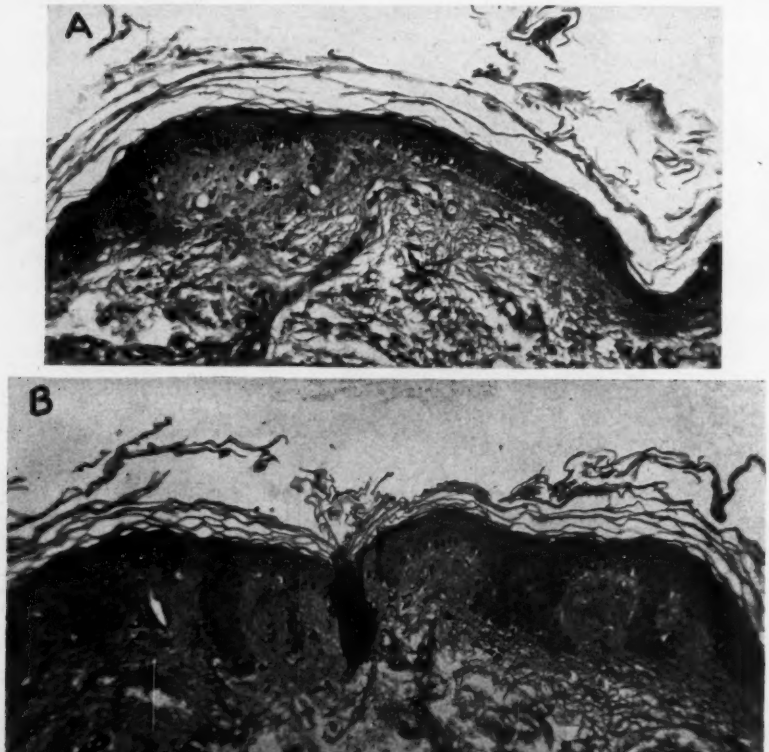

FIG. 2. The effect of 30 days' application of testosterone propionate. A–Control, B–Test. Enlargement of the epithelial pegs is the predominant feature. Hematoxylin–eosin, x 155.

clearly visible. A parallel, vertical arrangement of the cells is present. The cuboidal cells of the basal layer have now become tall columnar and show so-called palisading.

There are also changes in the keratinous component. In the untreated skin the stratum granulosum is discontinuous and consists only of one or two layers of very flat, densely keratinized cells. After spraying, the cells of this layer are much larger, nuclei are retained, and keratin granules are visible as discrete entities. The beginning accumulation of keratin granules can be observed even in the elongated cells of the deeper layers. There is increased pigmentation of the basal cells. A marked increase in pigment was observed from time to time (fig. 5) and even changes of the elastic structures were noted occasionally, but they were not observed in many instances and were not consistent enough to warrant further comment at this time.

At no time during either series of observations was any degree of hyperplasia observed, nor was round cell infiltration (characteristic of incipient epithelioma) seen at any time. It must be kept in mind, however, that ours were relatively short-term experiments which give no information as to the effects of steroid application carried out over periods of many months or even years.

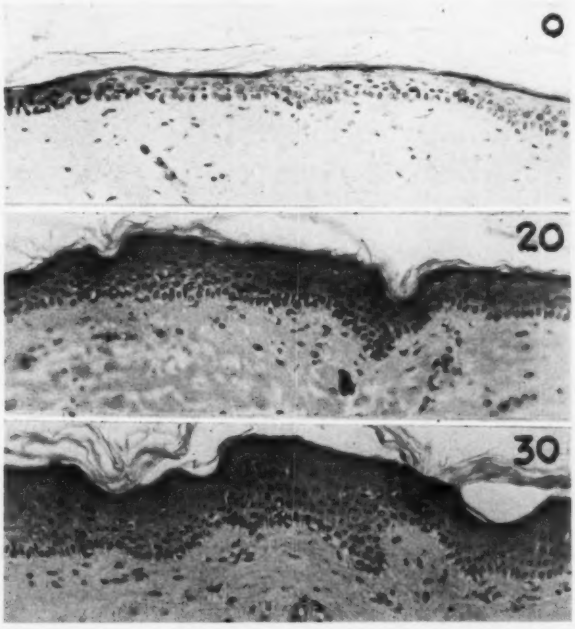

FIG. 3. The effect of 30 days' application of testosterone propionate. Biopsies at 0, 20, and 30 days are shown. The response is predominantly one of general epidermal thickening. Hematoxylin–eosin, x 150.

DISCUSSION

The observation of alterations of pigment metabolism is entirely in accord with the studies of Edwards, Hamilton, Duntley, and Hubert (2), who investigated the effect of testosterone on skin pigments and skin circulation by reflectance-spectrum studies. This, together with changes observed in keratin production, makes it imperative to study far more intensively the relation of steroids

to the metabolism of aging skin. We are at present engaged in these investigations, using a modification of the Edwards reflectance technique, together with special histochemical methods such as the Feulgen reaction or optical absorption at 285 $\mu\mu$—both of which give information regarding the thymonucleic acids present in the cells. There is evidence that these substances are of importance in the process of cellular growth.

It must also be kept in mind that the concentration of steroids used is far beyond the physiologic range. We have already noted the absence of sex-specificity in the response at these levels. The possibility then arises that the effects we have observed are merely pharmacologic phenomena, comparable with the anesthetic effect of desoxycorticosterone acetate injected intraperitoneally. Although analogy with the specific steroid-responsiveness of other epithelial cells (vaginal, urethral, buccal) speaks against this assumption, we are nevertheless engaged in investigating the properties of other steroids, such as Δ^5 pregnenolone, progesterone, desoxycorticosterone acetate, etc. when applied directly to the skin.

Finally, the frequent dissociation of aging of the skin and chronologic age must not be overlooked. On the one hand, there are individuals well on in years with a relatively youthful, ruddy skin showing none of the

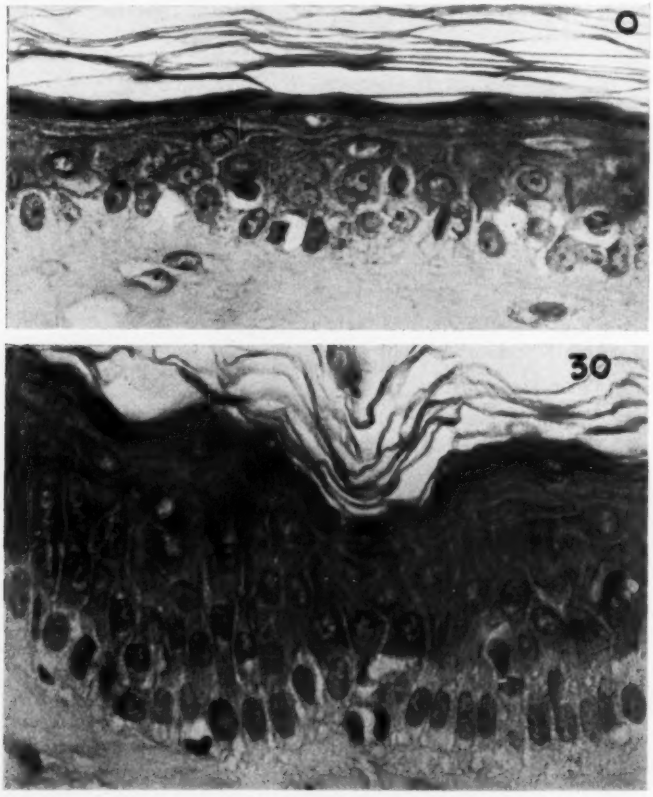

FIG. 4. Effect of 30 days' estrogen therapy. Hematoxylin–eosin, x 660.

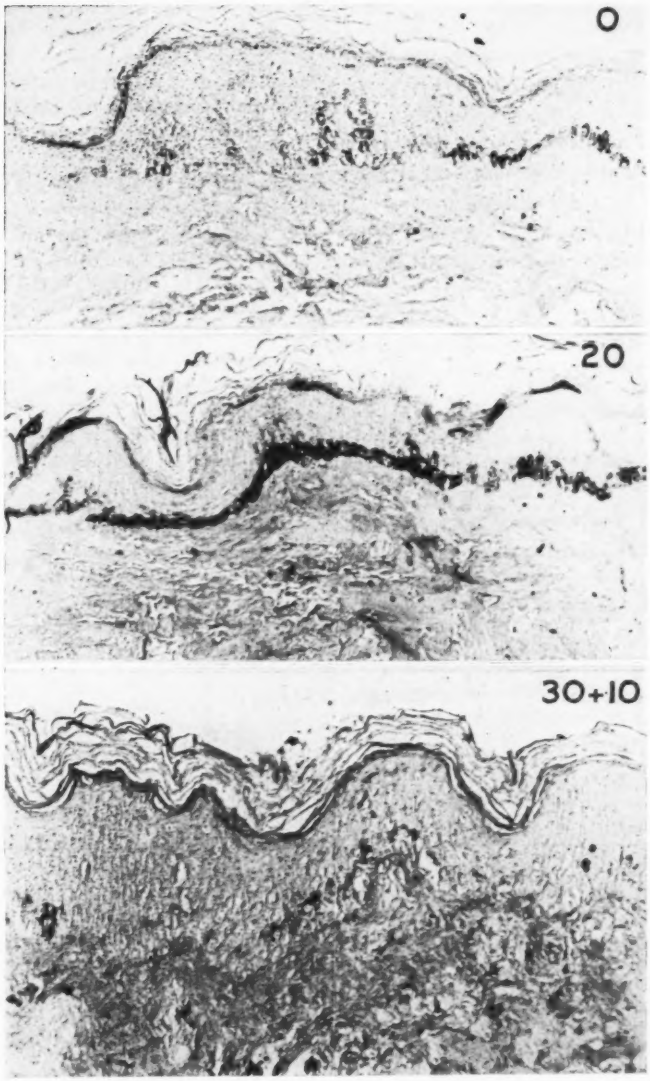

FIG. 5. Changes of epidermal melanin content following testosterone propionate treatment. Biopsies at 0 and 20 days, and 10 days after the end of the 30-day course of treatment. Note the disappearance of the intense pigment deposits seen in the 20-day biopsy. Modified Levaditi stain, x 220.

atrophic phenomena described. At the other extreme there was a female aged 23 (verified by birth certificate) who appeared to be a great deal older than her mother (aged 46) judging from the integument only. It is evidently very important to correlate aging of the skin with the status of the organism in general, and we plan to investigate this aspect by means of intensive hormonal and metabolic studies.

Summary

Preliminary studies have been presented showing that estrogen and testosterone are directly capable of causing regeneration of the senile epidermis. Above a certain dosage both these substances were found to produce identical effects (at the histologic level) which were independent of the sex of the test subject.

The implications of these observations are discussed and the direction of future investigation indicated.

From the Research Department and Endocrine Division of the Department of Medicine, St. Clare's Hospital, New York.

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The author's address is:

Dr. Joseph W. Goldzieher

104 East 40th Street

New York 16, New York

The Correlation Between the Clinical Appearance of the Skin and the Skin Lipid Secretion in Middle-Aged and Old Individuals

SVEN ANCHER KVORNING and ESBEN KIRK

IN A STUDY OF THE SEBUM SECRETION OF A GROUP OF 84 MEN AND 75 WOMEN DR. KVORNING AND DR. KIRK OBSERVED SOME CORRELATION BETWEEN THE QUANTITY OF LIPID SECRETED AND THE APPEARANCE OF THE SKIN. THE CORRELATION WAS PARTICULARLY APPARENT BETWEEN THE AMOUNT OF SECRETED SEBUM AND THE SIZE OF THE OPENINGS OF THE SEBACEOUS DUCTS AND WAS MORE NOTICEABLE IN THE WOMEN THAN IN THE MEN.

IN A recent publication by Kirk (1) a report was given on the results of quantitative estimations of the lipid secretion of the skin in a large group of young, middle-aged, and old individuals. The study disclosed a marked difference between the skin fat secretion in the old men and the old women, the secretion being 2 to 3 times greater in the men than in the women. The lipid secretion was measured on a 10 sq. cm. area of the skin of the forehead during a twelve hour period and a subsequent four hour period, the twelve hour secretion closely representing the maximum lipid secretion of the skin area, the four hour secretion being indicative of the secretory rate.

The difference in skin lipid secretion between old men and women does not appear to have been noted previously. In view of the analytic findings it appeared of interest to determine if any correlation could be established between the clinical appearance of the skin and the degree of activity of the sebaceous glands.

A total of 159 middle-aged and old individuals, 84 men and 75 women, for whom quantitative data on the skin lipid secretion were available, were subjected to the study. The individuals were examined 6 to 8 hours after they had last washed their faces so that a representative amount of lipid could be expected to be present on the skin of the forehead. In addition to an appraisal of the degree of greasiness, the investigation was extended to include observations on the thickness, turgor, moistness, and degree of wrinkling of the skin, as well as an evaluation of the size of the openings of the sebaceous ducts on the skin surface. The appraisal of the condition of the skin was performed by two observers who were unacquainted with the results of the chemical analyses. The ratings of the two investigators, which were subsequently correlated with the analytic data acquired from the skin secretion tests, usually agreed closely and never differed by more than one subgrouping.

EXPERIMENTAL

The results of the correlation between the clinical estimation of the skin condition and the skin secretion tests have been entered in table 1 and in figures 1 to 5. The table shows

Dr. Kvorning is Research Assistant at the Division of Gerontology, Washington University School of Medicine. He obtained his M.D. degree in 1941 from the University of Copenhagen and has since been engaged in clinical and research work. From 1945 to 1948 he was Lecturer in Pharmacology at the University of Copenhagen.

Dr. Kirk is Assistant Professor of Medicine and Director of Research, Division of Gerontology, Washington University School of Medicine. He received his M.D. degree in 1929 from the University of Copenhagen and was certified as a specialist in internal medicine (1938) and clinical pathology (1948). From 1931 to 1934 Dr. Kirk was assistant resident physician at the Rockefeller Institute. From 1936 to 1939 he was on the staff of the medical university clinic and director of the City Laboratories, Copenhagen. From 1939 to 1947 he was chief physician at the medical service, Holstebro County Hospital, Denmark.

His primary fields of research have been in clinical medicine and biochemistry. He is a member of the American and Danish Gerontological Societies and the Danish Society for Internal Medicine, a member of the Harvey Society, and a Fellow of the Royal Society of Medicine, England.

the mean secretion value and the range of values for each subgrouping, whereas the figures represent frequency distribution curves. In comparison of the values given in the table and in the figures it should be recalled that the mean value given in the table is the arithmetic average for the subgroup, whereas the vertex of each of the distribution curves indicates the mode of the subgroup. Since the distribution curves are frequently of the asymmetric type a close correspondence between the arithmetic mean and the mode cannot be expected in all instances.

Greasiness of the skin.—The clinical estimation of the degree of greasiness of the skin of the forehead was made by inspection and by rubbing a finger gently over the skin surface. The amount of sebum present evaluated in this way was classified as reduced, normal, increased, and considerably increased (oily skin). As seen from table 1 and figure 1 except for the patients with an oily skin no certain correlation could be found in the men between the clinical evaluation and the secretion values. In the women a clinical distinction between a decreased and a normal amount of lipids on the skin surface did not prove possible either, whereas in this group the appraisal in individuals with increased lipid secretion on the whole was quite reliable, the mean secretion values for the women classified as having a greasy skin on the whole being definitely higher than in the female individuals with an apparently normal skin. In spite of the fair correlation in the women between the clinical estimation of greasiness and the analytically observed values, the degree of overlapping of the distribution curves indicates that the clinical evaluation in the individual subject may be erroneous.

The data for the men and the women presented in the table suggest that a smaller amount of sebum is required on the skin in women to give the impression of a normal lipid secretion than in the men, the mean value for the normal appearance in the men in the twelve hour secretion tests being 2.6 mg. per 10 sq. cm., as compared with 1.6 mg. for the women. It appears quite likely that this fact may explain, at least partly, why the difference in skin lipid secretion between old men and women has not previously been noted.

Thickness of the skin.—The thickness of the skin of the forehead was estimated by folding the skin and subcutaneous tissue and the finding recorded as atrophic, thin, normal, and thickened skin. The results (table 1 and figure 2) show a good degree of correlation between the skin thickness and the lipid secretion in the women, where-

as no certain correlation was noted in the men.

Turgor of the skin.—The turgor of the skin was examined by observing the degree of skin resilience subsequent to lifting the skin into a fold. As will be seen from table 1 the turgor was found definitely reduced in most of the subjects studied. The table further shows that the secretion values are practically the same in the male subjects with reduced and with normal skin turgor, whereas in the women a higher secretion value was found in the subjects with a normal skin turgor.

Moistness of the skin.—The degree of moistness of the skin was estimated by inspection and by gentle touching of the skin of the forehead during conditions where the patients were not subjected to excessively warm environments. No certain difference was noted either in the men or in the women between the moistness of the skin and the amount of sebum secreted.

Openings of sebaceous ducts.—The system of rating used in the classification of the skin according to the appearance of the

TABLE 1. THE CORRELATION BETWEEN THE CLINICAL APPEARANCE OF THE SKIN OF THE FOREHEAD AND THE LIPID SECRETION ON A 10 SQ. CM. AREA

	Men Mg. lipid secretion					Women Mg. lipid secretion				
	No.	12 hour period		4 hour period		No.	12 hour period		4 hour period	
		Mean	Range	Mean	Range		Mean	Range	Mean	Range
Greasiness of skin										
Reduced	11	2.5	0.6– 5.2	1.8	0.6–2.9	26	1.5	0.3–4.7	0.8	0.1–3.2
Normal	33	2.6	1.2– 4.7	1.8	0.4–3.8	28	1.6	0.5–7.5	0.9	0.2–2.4
Increased	38	3.4	0.5– 7.3	2.6	0.7–7.0	22	3.3	1.1–8.9	2.1	0.5–5.7
Greatly increased	2	8.3	3.6–13.0	1.6	0.8–2.5					
Thickness of skin										
Atrophic	2	2.3	1.7– 2.7	1.8	1.6–2.1	2	2.0	1.0–3.0	0.4	0.3–0.4
Thin	21	2.6	0.5– 5.4	1.7	0.4–3.2	28	1.1	0.3–2.8	0.5	0.1–1.3
Normal	43	3.4	0.5–13.0	2.3	0.7–7.0	37	2.4	0.5–8.1	1.5	0.2–5.7
Thickened	18	3.2	1.0– 7.3	2.4	0.9–5.8	9	3.9	1.5–8.9	2.4	0.9–5.3
Turgor of skin										
Reduced	65	3.0	0.5–13.0	2.1	0.4–7.0	59	1.9	0.3–8.1	1.0	0.1–5.7
Normal	19	3.4	1.4– 7.0	2.6	0.9–5.8	16	2.8	0.7–8.9	2.0	0.5–5.3
Moistness of skin										
Reduced	24	3.3	0.5–13.0	2.0	0.4–4.3	23	1.9	0.4–5.5	0.8	0.1–3.2
Normal	59	3.0	1.0– 7.3	2.3	0.7–7.0	53	2.1	0.3–8.9	1.4	0.2–5.7
Openings of sebaceous ducts										
Not visible	7	2.9	1.4– 6.4	1.9	0.6–4.3	18	1.1	0.4–3.0	0.5	0.1–1.9
Visible	22	2.9	0.5– 5.4	1.9	0.8–3.8	20	1.5	0.3–3.6	0.8	0.2–1.7
Distinct	45	2.9	1.2– 7.3	2.1	0.4–4.6	26	2.5	0.6–7.5	1.4	0.2–3.2
Large	10	4.5	1.0–13.0	3.3	0.9–7.0	12	3.5	0.9–8.9	2.5	0.5–5.7
Wrinkles of skin										
Absent	7	3.2	1.4– 7.0	2.4	0.8–5.7	11	2.8	0.5–8.1	1.9	0.2–5.7
Fine radiating	4	3.6	2.4– 5.2	2.3	1.1–3.2	11	1.0	0.4–3.0	0.4	0.1–0.9
Transverse superficial	50	2.9	0.6– 7.3	2.0	0.4–4.6	39	1.9	0.4–7.5	1.1	0.1–3.2
Transverse deep	23	3.4	0.5–13.0	2.4	0.8–7.0	15	2.3	0.3–8.9	1.5	0.3–5.3

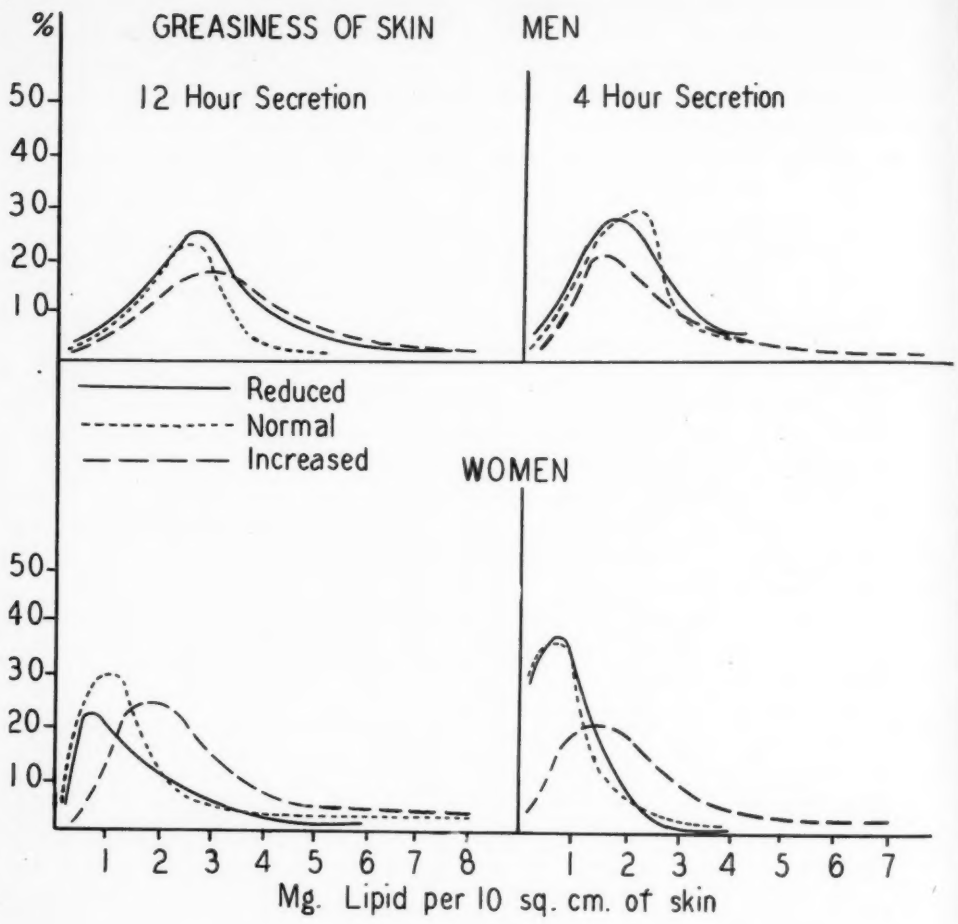

FIG. 1. Correlation between skin lipid secretion and greasiness of skin.

openings of the sebaceous ducts was: not visible, visible, distinct, and enlarged. A correlation of the clinical evaluation and the results of the secretion tests shows that individuals with distinct and enlarged skin pores on the average show a higher lipid secretion than those in whom the glandular openings were small or invisible (table 1 and figure 3). This correlation was noticeable both in the male and the female individuals and constitutes the highest degree of correlation between the clinical and analytical observations found in this study.

Wrinkling of the skin.—In the estimation of the degree of wrinkling of the skin of the forehead, besides the direct inspection of the skin, observations were made on the behavior of the skin during voluntary wrinkling of the forehead. The furrows of the skin were classified as absent, fine radiating, transverse superficial, and transverse deep, the last designation signifying a condition of

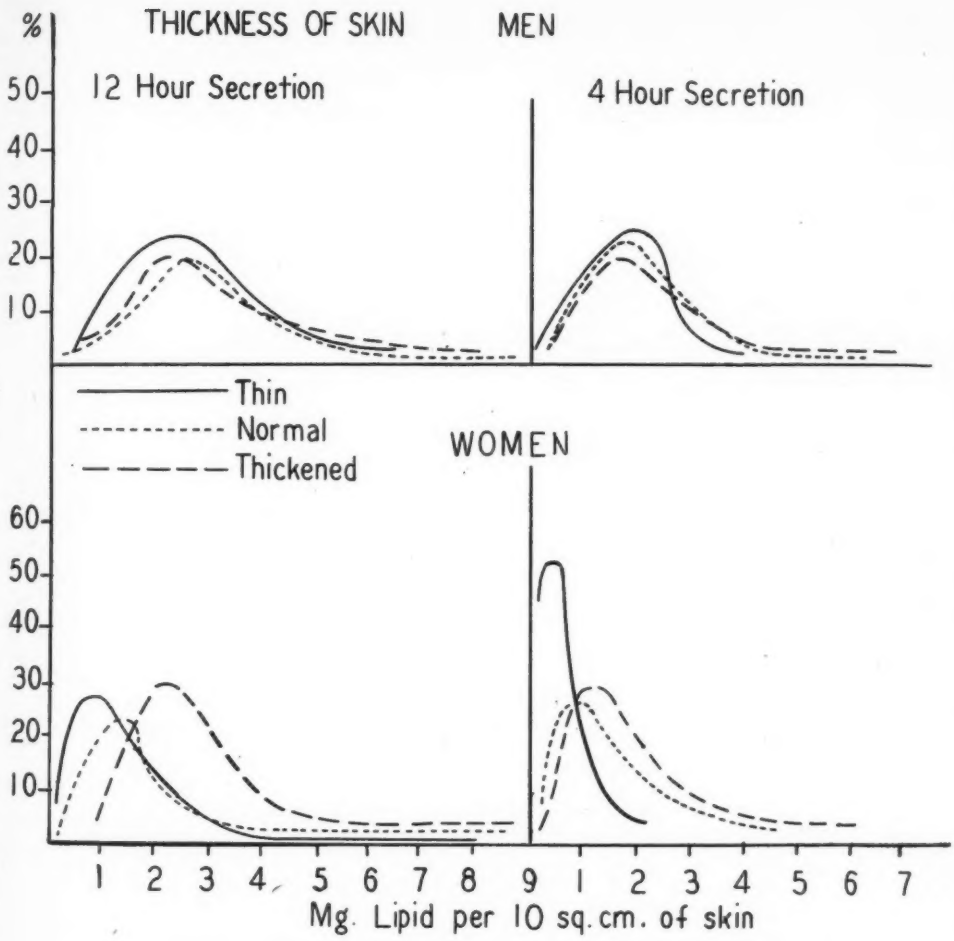

FIG. 2. Correlation between skin lipid secretion and thickness of skin.

the skin in which the wrinkles, besides having a permanent character, were connected with a pasty appearance of the intermediary skin areas.

The correlated data, presented in table 1 and figure 4, fail to show any definite correlation between the degree of furrowing and the skin lipid secretion.

Amount of hair on the scalp.—As mentioned in the introduction, observations on the amount of hair present on the scalp were included in the study in spite of the fact that skin secretion tests were not performed on the skin of the scalp. The reason for this inclusion was the desire to investigate if the contention that an increased sebaceous secretion is associated with a tendency to loss of hair on the scalp could be substantiated by examination of a larger group of individuals.

Out of the 159 subjects included in the study 13, or 8 per cent, had an amount of

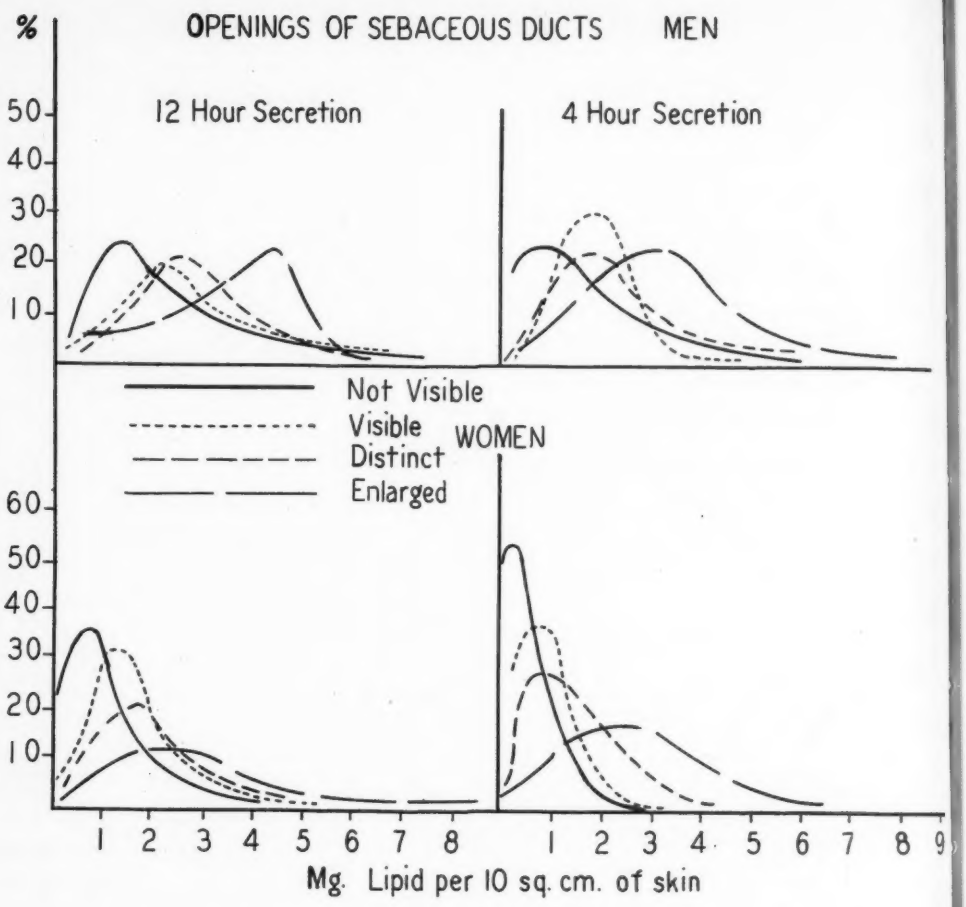

FIG. 3. Correlation between skin lipid secretion and size of openings of sebaceous ducts.

hair which would be considered normal or nearly normal if found in a younger individual, whereas the amount of hair in the remaining individuals could be classified as scanty or very scanty to bald.

The results (figure 5) show that neither in the men nor in the women could any consistent difference be found in the average lipid secretion between the nearly bald individuals and the group having a moderate amount of hair left.

SUMMARY

A comparison in middle-aged and old individuals of the quantity of lipid secreted on the forehead and the appearance of the skin revealed in both sexes a good correlation between the chemically measured amount of sebaceous secretion and the size of the skin pores. In the women a fair correlation was further found between the lipid secretion and the greasiness, thickness, and turgor of the skin. Construction of

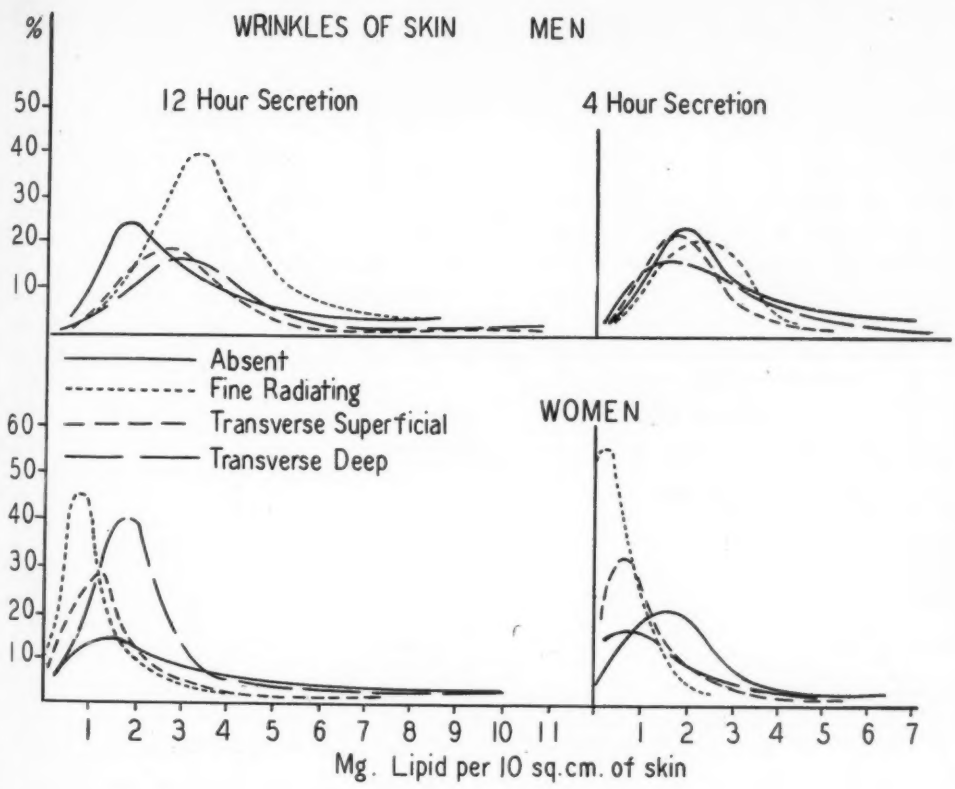

FIG. 4. Correlation between skin lipid secretion and character and degree of wrinkling of the skin.

frequency distribution curves for the lipid values showed an appreciable overlapping of the subgroups for each of the signs studied.

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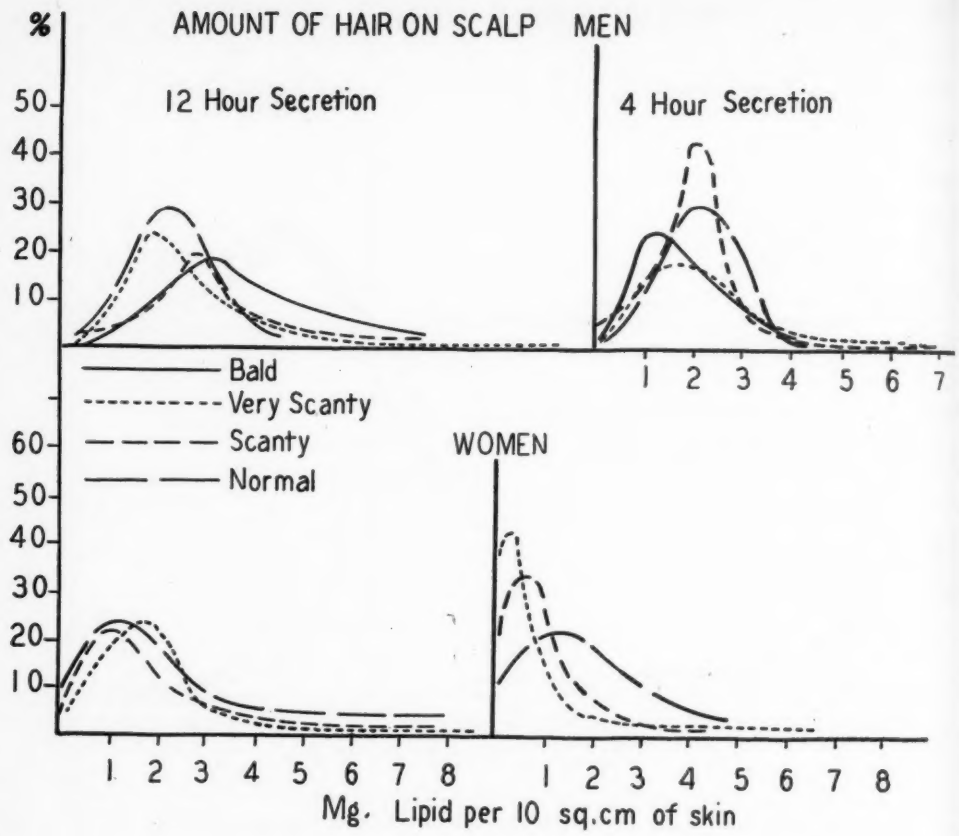

FIG. 5. Correlation between skin lipid secretion (on forehead) and quantity of hair on scalp.

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The senior author's address is:

DR. SVEN ANCHER KVORNING

DIVISION OF GERONTOLOGY

WASHINGTON UNIVERSITY SCHOOL OF MEDICINE

ST. LOUIS 9, MISSOURI

Constipation in the Aged, Attempts at Therapy

H. SORTER, M. BERG, and H. NECHELES

CONDUCTING AN INVESTIGATION OF THE EFFECTIVENESS OF CATHARTICS ON A GROUP OF 37 ELDERLY PATIENTS, DR. SORTER, DR. BERG, AND DR. NECHELES ADMINISTERED URECHOLINE AND PERISTALTIN. THE LATTER DRUG PROVED TO BE EFFECTIVE IN 78 PER CENT OF THE CASES, THE FORMER IN ONLY 23 PER CENT.

IN OUR experience in the Home for Aged Jews in Chicago, in the free clinics of the Michael Reese Hospital, and with private patients, constipation has been one of the most frequent complaints in people above 60 years of age and one of the most vexing problems therapeutically. The present work was undertaken in order to evaluate the

TABLE 1. CONSTIPATION TREATED WITH URECHOLINE

Patient No.	Age yrs.	Sex M, F	Ambulatory	Bedridden	Diagnosis	Urecholine			Results	
						Mg.	Daily doses	Duration months	Satisfactory	Unsatisfactory
1	67	F	x		Arteriosclerosis, hypertension	15	3	2	x	
2	72	M	x		Emphysema, arteriosclerosis, hypertension	15	3	4	x	
3	61	F	x		Arteriosclerotic heart disease	20	4	4		x
4	65	F	x		Arteriosclerotic heart disease, hypertension, arthritis	20	4	2		x
5	53	M	x		Bronchial asthma	10	3		x	
6	75	M	x		Hemiplegia, diabetes, arthritis	15	4	4½	x	
7	78	F	x		Generalized arteriosclerosis, hemorrhoids, senility	15	4	½		x
8	75	M	x		Arteriosclerotic heart disease, hypertension	15	4	½		x
9	78	F	x		Arteriosclerotic heart disease, arthritis	10	4	½		x
10	84	F	x		Arteriosclerotic heart disease, hypertension	20	4	½		x
11	61	F	x		Arteriosclerotic heart disease	20	4	1		x
12	72	F		x	Fracture neck of femur, arteriosclerotic heart disease	20	4	⅓		x
13	82	F		x	Parkinson's disease, arteriosclerotic heart disease, arthritis	20	4	½		x
14	80	F		x	Hemiplegia, generalized arteriosclerosis	20	4	½		x
15	84	F		x	Arteriosclerosis, senility	20	3	½		x
16	80	M		x	Arteriosclerosis, hypertension, postoperative prostatectomy	20	4	½		x
17	82	M		x	Arteriosclerotic heart disease, decompensation	20	4	⅓		x

Dr. Sorter received her M.D. degree from the University of Vienna in 1935. She is resident physician of the Michael Reese Hospital and Medical Director of the Home for Aged Jews in Chicago. Dr. Sorter is interested in gastro-enterology and gerontology and is a member of the American Medical Society.

Dr. Berg received his M.D. degree from the University of Illinois in 1935 and his Ph.D. in 1940. He is on the teaching staff of the Department of Medicine of the University of Illinois, on the clinical staff of the Michael Reese Hospital, and on the attending staff of the Woodlawn Hospital, Chicago.

Dr. Necheles received his M.D. from the University of Hamburg in 1923 and his Ph.D. in 1924. From 1925 to 1932 he served as associate professor of physiology, Peiping Union Medical College and since 1932 as associate professor and later professor of the Department of Physiology, University of Chicago. Since 1932 he has been director of Gastro-intestinal Research, Medical Research Institution of the Michael Reese Hospital. He is a member of the Physiological Society, the Society for Experimental Biology, the Gastro-Enterology Association, the Society for Internal Medicine, and his chief interest is clinical gastro-intestinal physiology.

great number of different laxatives used in the Home, to eliminate those that were little effective and to find one or two which would appear most useful. We define constipation as a condition in which a bowel movement does not occur with *complete* evacuation at least every 48 hours (Hurst, 2).

Most of our patients had been constipated for the last ten years, many of them for thirty years or longer, i.e., as long as they were able to remember. All patients were subjected to thorough clinical examination in order to eliminate other conditions which may lead to constipation. Their diets were regulated as far as possible. In old persons with set habits and reluctance to change their ways of living and eating usually this was difficult. Attempts were also made to increase the daily amount of fluid intake, which we often find to be deficient in aged people. This, however, was not achieved to a satisfactory degree in most instances. Most of the constipated patients would go for a week without bowel movement and a number would develop impaction. In none of them would normal motion establish itself without enemas and drugs. All of the patients reported had acquired the habit of taking laxatives, and it was usually not possible to dissuade them from continuing it, nor was it possible to establish regularity of bowel habits in those in whom laxative medication could be interrupted. The following drugs used by the patients were either self-prescribed, recommended by their druggist, or prescribed by their physician: Ex-lax, Seidlitz powders, Hinkle pills, Leo pills, Sal Hepatica, Cascara pills, Laxaline, Epsom salt, milk of magnesia, mineral oil, phospha soda, Feenamint, Dr. Carter's Liver Pills, Castoria, and probably most other drugs on the market. They had been taken for years or decades. All of them were found to lack prolonged therapeutic effectiveness and were discontinued.

All cases of constipation reported here were caused by the lack of tone and of contractile power of the sigmoid colon and of the rectum. Therefore, our first attempt was in the direction of increasing tone and motility of the bowel by the use of cholinergic drugs. It has been our experience in tests on human subjects that this group of drugs increases tone and motility of the ileum and of the colon and that it may produce defecation. Consequently, Urecholine, methane-beta-methyl-choline chloride, was employed. The drug acts primarily as a stimulant of the parasympathetic nervous system. It has a prolonged effect because it is not destroyed by cholinesterase. Therapeutically effective doses have little effect upon heart rate, blood pressure, or peripheral circulation of normal human subjects. The drug is known to increase peristalsis and to stimulate defecation (Starr and Ferguson, 4). Reactions to the drug are rare following oral therapeutic doses, such as

10 to 20 mg. three times daily. The use of Urecholine is contraindicated in asthmatic conditions.

After a trial with Urecholine in 17 patients had been disappointing, we turned our attention to improved preparations of cascara sagrada. The use of this drug seem to be a contribution by the Indians of California, who used the bark of the cascara tree for the treatment of constipation. Preparations of cascara are used widely and cascara is considered to be one of the best laxatives. However, in the aged, the use of crude cascara preparations did not yield much better laxative effects than most other of the many compounds used by our patients.

With the possibility in mind that the purified water soluble glycosides of cascara sagrada might be more effective in the aged than the crude compounds, such drug was

TABLE 2. CONSTIPATION TREATED WITH PERISTALTIN

Patient No.	Age yrs.	Sex M, F	Ambulatory	Bedridden	Diagnosis	Peristaltin		Results	
						No. of pills per day	Duration months	Satisfactory	Unsatisfactory
1	75	M	x		Hemiplegia, diabetes, arthritis	1	2	x	
2	65	F	x		Arteriosclerotic heart disease, hypertension	2	1½	x	
3	60	F	x		Bronchial asthma, emphysema	2	1	x	
4	66	F	x		Arteriosclerotic heart disease, arthritis	4	1		x
5	65	F	x		Arteriosclerotic heart disease, hypertension, arthritis	4	1		x
6	50	F	x		Arteriosclerotic heart disease, arthritis	4	1		x
7	61	F	x		Arteriosclerotic heart disease	2	3	x	
8	78	M	x		Arteriosclerotic heart disease	2	2	x	
9	81	M	x		Hodgkin's disease, arteriosclerotic heart disease	2	3	x	
10	81	M	x		Chronic coronary insufficiency, arteriosclerotic heart disease	1–2	3	x	
11	81	M	x		Arteriosclerotic heart disease, hypertension	2–4	2		x
12	79	F	x		Arteriosclerotic heart disease, decompensation	2–4	2		x
13	82	F	x		Arteriosclerotic heart disease, arthritis	2	3	x	
14	81	M	x		Spondylarthritis, arteriosclerotic heart disease, hypertension	1–2	3	x	
15	83	F	x		Arteriosclerotic heart disease, decompensation	1–2	2	x	
16	80	F	x		Arteriosclerotic heart disease	2–4	2	x	
17	80	F	x		Arteriosclerotic heart disease	2	3	x	
18	82	F	x		Arteriosclerotic heart disease	2	4	x	
19	83	F	x		Arteriosclerotic heart disease, hypertension, cystitis	1–3	4	x	
20	81	M	x		Diabetes mellitus, arteriosclerotic heart disease	2	3	x	
21	84	M	x		Parkinson's disease, arteriosclerotic heart disease, decompensation	2	4	x	

TABLE 2. CONSTIPATION TREATED WITH PERISTALTIN—Continued

Patient No.	Age yrs.	Sex M, F	Ambulatory	Bedridden	Diagnosis	Peristaltin		Results	
						No. of pills per day	Duration months	Satisfactory	Unsatisfactory
22	88	M	x		Arteriosclerotic heart disease, gastritis	2	3	x	
23	80	F	x		Arteriosclerotic heart disease, hypertension	2	2	x	
24	80	F	x		Cancer of breast, arteriosclerotic heart disease, hypertension	1–3	3	x	
25	50	F		x	Coronary occlusion, cardiac decompensation	4	5	x	
26	66	F		x	Coronary occlusion, cardiac decompensation	4	3	x	
27	50	M		x	Chronic duodenal ulcer, postoperative suprapubic cystostomy	4	1		x
28	84	F		x	Arteriosclerotic heart disease, decompensation				x
29	79	F		x	Arteriosclerotic heart disease, fractured femur, cancer of breast	2–4	6	x	
30	82	F		x	Parkinson's disease, arteriosclerotic heart disease	2	6	x	
31	84	F		x	Arteriosclerotic heart disease, nephrosclerosis	1–3	2	x	
32	80	F		x	Hemiplegia, arteriosclerotic heart disease	1–2	6	x	
33	84	F		x	Arteriosclerotic heart disease, decompensation, cystitis	1–3	2		x
34	84	F		x	Arteriosclerotic heart disease, gangrene of toe	2	3	x	
35	71	F		x	Arteriosclerotic heart disease, diabetes mellitus, encephalomalacia	2–4	4	x	
36	84	F		x	Anorexia, arteriosclerotic heart disease	1–3	4	x	
37	81	F		x	Arteriosclerotic heart disease, hypertension, obesity	2	3	x	

employed in the form of Peristaltin, the composition of which is unlike the crude extracts of the bark. Tablets of Peristaltin were used exclusively; we never felt the need for intravenous or intramuscular injection. The tablets are small and can be swallowed easily. Cascara belongs to the group of anthraquinone cathartics, other members being aloe, senna, and rhubarb. The active group common to these compounds is emodin, trioxymethylanthraquinone.

The variation in effectiveness among the emodin cathartics is due to the presence of other constituents in the crude preparations, the manner in which the active principle is bound, and its ease of liberation (Goodman and Gilman, 1). The action of extracts of cascara begins in the alkaline medium of the small intestine, with some increase in

peristalsis. Here they are hydrolyzed or oxydized, yielding oxymethyl-anthraquinones, which produce cathartic action. Their full effect occurs in the colon where propulsive peristalsis is stimulated greatly, producing a soft stool usually within six to eight hours. The emodin group seems to be quite specific for the colon, because intravenous injection of Peristaltin increases motility of the colon and leads to evacuation (intravenous preparations are used more in veterinary medicine).

Susceptibility is not lost with prolonged use, and the establishment of regular habits usually permits gradual withdrawal of the drug (Sollman, 3). In our cases reduction of the dose was possible, but not complete withdrawal. Peristaltin is not a drastic laxative and should not be given in large doses in order to produce rapid emptying.

In all cases we have observed, one to four tablets a day initially were sufficient to produce evacuation. Thereafter the dose was reduced individually to obtain one soft bowel movement a day. In a few cases, oil retention enemas were administered with the first dose of the drug in order to overcome impaction. In our experience, the laxative effect appeared one to two days after the administration of Peristaltin.

Results

Of 17 patients, 6 males and 11 females, treated with Urecholine, satisfactory effects were obtained in 4 only (see table 1). By satisfactory effects we understand that a large bowel movement was initiated by the drug and that the patient could be kept regular by daily administration of the drug. The four satisfactory results were obtained in ambulatory patients, 1 female and 3 males with 10 to 15 mg. doses, 3 to 4 times a day. In none of the bedridden patients was bowel movement elicited. No cramping, urination, or other side reactions were complained about by any of the patients. The ages of these patients varied between 61 and 84, with an average age of 74 years. The duration of treatment with Urecholine was from ten days to four and a half months.

Thirty-seven patients were treated with Peristaltin, 10 males and 27 females (see table 2). Their ages varied between 50 and 88 years, with an average of 78 years; 24 patients were ambulatory and 13 were bedridden. Satisfactory results were obtained in 29 patients (78 per cent) against unsatisfactory results in 8 patients (22 per cent). Nineteen patients of the satisfactory group were ambulatory (66 per cent) and 10 were bedridden (34 per cent). Unsatisfactory effects were observed in 5 ambulatory and in 3 bedridden patients. One to four pills a day were administered for periods of one to six months. As can be seen in table 2, those patients with unsatisfactory results received the highest doses of the drug while a number of those with satisfactory results had been reduced to one to two pills daily. The bedridden patients required on the average higher doses than the ambulatory patients for satisfactory results. In no case in this group was administration of Peristaltin followed by discomfort. Most of the patients in the Home for aged Jews were taken off Peristaltin medication for a period of six weeks, and previously used laxative drugs were substituted. All of these patients became constipated again and were put back on Peristaltin medication, to which they responded in the way as before.

Discussion

Senile chronic constipation, according to Hurst (2), is due mainly to atonic dilatation and deficient peristalsis of the colon, resulting from atrophy of its musculature. Contributory factors are the smaller quantity and the bland character of the food often taken in old age. Also, defecation is less efficient, as the voluntary muscles which help in defecation share the senile atrophy of the muscles of the body, which is due in part to the sedentary life led by most old people. This description by Hurst fits most, if not all of our patients. In addition, lack

of training in bowel hygiene, faulty diet, lack of sufficient intake of water, childbearing, and prolonged use of laxative drugs are factors which contributed to the habitual constipation seen in our patients. In our experience with a great number of drugs employed in the treatment of senile constipation, none offered the same mild, nonirritating laxative effects as the preparation of the purified, concentrated, water soluble glycosides of cascara sagrada employed. Since senile constipation often is a very serious problem, and as we are sure that other homes for the aged will have similar experiences as we had, we want to communicate our results for further trial in geriatric practice.

Summary

A group of 17 patients with senile constipation was treated with daily oral doses of 30 to 80 mg. of Urecholine. Only four patients of this group obtained beneficial results.

A group of 37 patients with senile constipation were treated with a preparation of the purified water soluble extract of cascara sagrada (Peristaltin). Satisfactory results were obtained in 78 per cent of the cases.

This paper is from the Department of Gastro-Intestinal Research (supported in part by the Michael Reese Research Foundation), Medical Research Institute of Michael Reese Hospital, and from the Home for Aged Jews, Chicago, aided by a grant from the A. B. Kuppenheimer Fund. The cooperation of Mr. B. Grossman, Director of the Home, and of the Nursing Staff is acknowledged. Drugs were supplied by E. Merck & Co. and Ciba Pharmaceutical Products, Inc.

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The senior author's address is:

Dr. H. Sorter

Michael Reese Hospital

Medical Research Institute

29th Street and Ellis Avenue

Chicago 16, Illinois

Chronaxie Studies in Thiamine Deficient Old Individuals

MARGARET CHIEFFI and ESBEN KIRK

IN ORDER TO DETERMINE IF CHRONAXIE STUDIES WOULD BE OF VALUE IN THE DIAGNOSIS OF THIAMINE DEFICIENCY IN OLD INDIVIDUALS, DR. CHIEFFI AND DR. KIRK CONDUCTED AN EXPERIMENT ON 25 ELDERLY INDIVIDUALS WITH NORMAL BLOOD THIAMINE CONCENTRATIONS AND 25 WITH LOW THIAMINE VALUES AND FOUND NO SIGNIFICANT DIFFERENCE BETWEEN THE TWO GROUPS.

A STUDY was undertaken of the thiamine concentration of the blood in a large group of young, middle-aged and old individuals. The average blood value observed in 234 subjects of various ages was 3.4 micrograms per cent. The values tended to decrease slightly with age (coefficient of correlation age/thiamine blood concentration—0.20), and also individuals with a thiamine blood concentration below 2.5 micrograms per cent were encountered more frequently in the advanced age groups. A detailed report of the thiamine study will be given in another publication.

A clinical examination of the old individuals on whom blood thiamine values had been determined revealed, among other findings, that the percentage incidence of sensory nerve disturbances was higher in those subjects with a low thiamine concentration than in those with normal or high values. Impairment of the vibratory sense was the disturbance most frequently encountered. Since the diagnosis of sensory disturbances requires the intelligent cooperation of the patients, and in old debilitated subjects it is sometimes difficult to obtain such cooperation, the substitution of a more objective test for peripheral nerve lesions would be desirable. Although the clinical study of the patients with low blood thiamine values had revealed no evidence of motor disturbances it was thought possible, especially in view of the predominance of motor paralysis in fully developed cases of beriberi, that beginning motor lesions might be detected by chronaximetric examinations of the muscles. It has recently been shown by Bourlière (1) that the muscular chronaxie does not change with old age, a fact which would tend further to increase the usefulness of chronaxie studies for the diagnosis of specific lesions.

Although the literature on beriberi is rather large no studies on the muscular chronaxie in this condition appear to have been reported. Also no publications are available dealing with the chronaxie in patients with moderately severe vitamin B_1 deficiency in whom the deficiency was proved by the performance of thiamine blood analyses. From a study on 8 pregnant women who allegedly had lived on a vitamin B_1 deficient diet and who had developed various symptoms suggestive of thiamine deficiency Lewy (7) concluded that the motor chronaxie in thiamine deficiency can be

Dr. Chieffi is Research Assistant at the Division of Gerontology, Washington University School of Medicine. She obtained her M.D. degree from the University of New Zealand in 1938 and from 1940 to 1946 was on the staff of the Forlanini Hospital of the University of Rome. She was authorized as a specialist in chest diseases in 1944 and held the position as Instructor in Pulmonary Diseases at the University of Rome from 1944 to 1946. Her chief interests are in the fields of chest diseases and gerontology.

Dr. Kirk is Assistant Professor of Medicine and Director of Research, Division of Gerontology, Washington University School of Medicine. He received his M.D. degree in 1929 from the University of Copenhagen and was certified as a specialist in internal medicine (1938) and clinical pathology (1948). From 1931 to 1934 Dr. Kirk was assistant resident physician at the Rockefeller Institute. From 1936 to 1939 he was on the staff of the medical university clinic and director of the City Laboratories, Copenhagen. From 1939 to 1947 he was chief physician at the medical service, Holstebro County Hospital, Denmark.

His primary fields of research have been in clinical medicine and biochemistry. He is a member of the American and Danish Gerontological Societies and the Danish Society for Internal Medicine, a member of the Harvey Society, and a Fellow of the Royal Society of Medicine, England.

found both shortened and increased, the neuromuscular units first exhibiting an increased sensitivity to stimulation, and in later stages a decreased sensitivity. In evaluation of Lewy's conclusions it should, however, be pointed out that the patients included in the study also were found to suffer from a macrocytic anemia. This circumstance and the fact that for the relief of the symptoms besides yeast ingestions liver extract injections were administered make the interpretation of the part of the syndrome caused by vitamin B_1 deficiency rather difficult.

The present study was undertaken to supply information on the chronaxie values found in examination of a larger group of older individuals with proved thiamine deficiency

Methods

For blood thiamine determination the thiochrome method of Friedemann and Kmieciak (3) was employed. The chronaxie determinations were made on both supinator longus and tibialis anticus (proximal motor point) muscles by means of a condenser discharge type of chronaximeter, using electrodes of pure silver. The size of the stimulating electrode applied to the skin over the motor point of the muscle was 1.25 sq. cm. The area of the indifferent electrode which was attached to the skin of the epigastric region was 10 sq. cm. For application of the electrodes to the skin Cambridge electrode jelly was employed. The use of this jelly obviates the difficulties adherent to evaporation of solutions and conveniently delimits the stimulated skin areas.

In the performance of the chronaxie determinations the procedure of Lewy (5) was employed. After locating the motor point the rheobase was determined, the current was doubled, and the chronaxie recorded. Following determination of the chronaxie the current was increased by 20 to 30 per cent and the excitation time for the increased current determined, these latter measurements serving to establish the vertex characteristic of the strength-duration hyperbola and thus to locate the position of the vertex point of the curve. For details concerning the calculation of the vertex characteristics the reader is referred to the publications by Lewy (4, 5, 6). As a general rule it may be stated that a high chronaxie value and a high vertex characteristic denote a decreased sensitivity of the nerve-motor units, whereas a low chronaxie value and a low vertex characteristic indicate increased excitability.

It has been pointed out by various authors that the absolute chronaxie values measured are dependent on the chronaximeter used, especially the size of the electrodes. Although this is true a fair agreement between the

TABLE 1. THE CHRONAXIE IN OLD INDIVIDUALS WITH LOW AND WITH NORMAL BLOOD THIAMINE CONCENTRATIONS

	Chronaxie				Critical ratio	Vertex Characteristic				Critical ratio
	Low thiamine sigmas		Normal thiamine sigmas			Low thiamine sigmas		Normal thiamine sigmas		
	Mean	s.d.	Mean	s.d.		Mean	s.d.	Mean	s.d.	
Supinator longus, right	.25	.20	.20	.12	1.0	4.2	1.2	3.8	1.4	1.0
Supinator longus, left	.22	.13	.27	.22	0.9	3.9	1.3	4.2	1.8	0.6
Tibialis anticus, right	.38	.34	.33	.25	1.0	6.8	3.5	5.7	2.3	1.0
Tibialis anticus, left	.36	.31	.28	.16	0.5	6.1	2.6	5.4	1.8	0.9

values found by various authors may be expected. As a general rule it can be stated that the muscles of the upper extremities have a shorter chronaxie value than those of the lower extremities. Thus from extensive chronaxie studies in human individuals Bourguignon (2) gives the chronaxie value for the supinator longus as 0.06-0.14/1000 of a second or 0.06-0.14 sigmas, whereas the chronaxie of the proximal motor point of the tibialis anticus is approximately 0.16-0.34 sigmas. As emphasized by Lewy (6)

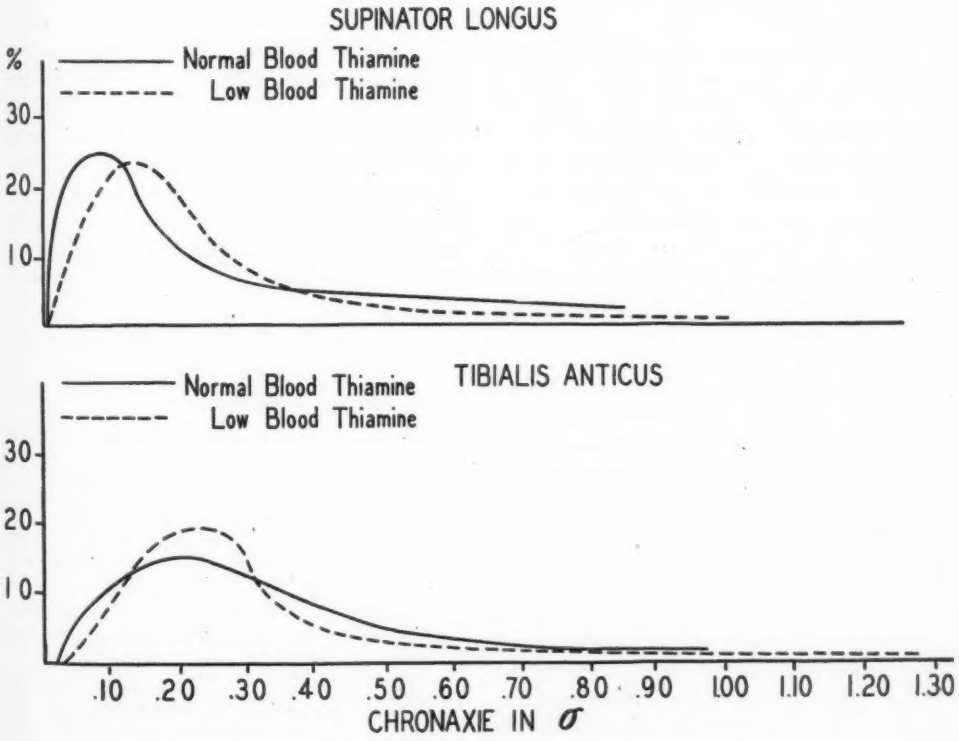

FIG. 1. Distribution curves for observed chronaxie values.

the absolute vertex characteristic values are likewise dependent on the type of muscle examined.

Chronaximetric determinations on both supinator longus and tibialis anticus muscles after the principles outlined above usually required thirty to forty-five minutes for each patient.

Experimental

Chronaximetric determinations were performed on 25 individuals with a low thiamine blood content (0.6 to 2.5 micrograms per cent) and on 25 subjects with normal blood thiamine values (3.5 to 6.5 micrograms per cent). All the patients were above 60 years of age. Patients with systemic nervous diseases were not included in the study. Determinations were also omitted on extremities showing residuals after cerebral or spinal vascular accidents or invalidating joint diseases.

The results of the chronaximetric determinations are presented in table 1 and in figure 1. As will be seen from the table the mean chronaxie values measured are in good agreement with those given by Bourguignon, the values for the tibialis anticus muscles as expected being definitely higher than for the supinator longus muscles. The standard deviation of the values are however somewhat higher than observed by Bourlière (1) in his recent study on the chronaxie of the biceps and flexor digitorum muscles in a group of old subjects. As evident from the calculated critical ratios no statistically significant differences could be demonstrated between the mean chronaxie values and the mean vertex characteristic values of the individuals having low thiamine blood concentrations and the patients with a normal blood thiamine content.

In figure 1 the percentage distribution curves for the observed chronaxie values have been constructed for the supinator longus and the tibialis anticus muscles respectively. The inclusion of such distribution curves was considered of importance in view of the finding by Lewy (7) of increased sensitivity to stimulation in the earlier stage of vitamin B_1 deficiency and decreased sensitivity in the later stages of this condition. As will be seen from the distribution curves no significant difference was observed between the patients with low and with high blood thiamine values. It would appear, therefore, from these observations that chronaximetric determinations are of no value in the diagnosis of moderately severe thiamine deficiency in old subjects.

Summary

Chronaximetric determinations on the supinator longus and tibialis anticus muscles were performed in 25 old subjects with low blood thiamine values and in 25 old individuals with normal blood thiamine concentrations, using a condensor discharge type of chronaximeter. The studies failed to reveal any statistically significant difference between the mean chronaxie values of the two groups. The percentage distribution of the observed individual chronaxie values was likewise essentially similar. On the basis of these findings it may be concluded that chronaximetric determinations do not appear to be of value in the diagnosis of moderately severe thiamine deficiency in old individuals.

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The senior author's address is:

Dr. Margaret Chieffi

Division of Gerontology

Washington University School of Medicine

St. Louis 9, Missouri

Serum Protein-bound Iodine and Age

W. B. KOUNTZ, MARGARET CHIEFFI, and ESBEN KIRK

IN A STUDY OF SERUM PROTEIN-BOUND IODINE IN A GROUP OF MEN AND WOMEN OF VARIOUS AGES, DR. KOUNTZ, DR. CHIEFFI, AND DR. KIRK FOUND A DECREASE WITH AGE IN THE SERUM IODINE CONCENTRATION IN THE MEN BUT NOT IN THE WOMEN.

THE determination of the organic iodine fraction of serum has received much attention in the last few years. Thus, it is generally assumed that the protein-bound iodine fraction may serve as an index of the level of circulating thyroid hormone (1, 6). For this reason the assay of the organic serum iodine content has been employed as a means of evaluating the thyroid function and as an aid in the clinical diagnosis of thyroid disease.

The decrease with age of the basal metabolic rate as measured by the oxygen uptake has been recognized since the introduction of reliable methods for determination of the metabolism. This decrease constitutes one of the most conspicuous changes in the physiology of the aging organism, and investigations tending to evaluate the factors responsible for the metabolic decline would appear to be of considerable interest. The recent development of practicable methods for determining the organic iodine fraction of serum furnished an opportunity to contribute information on the part played by the thyroid gland in the decrease of the total metabolism with age. The present study was undertaken with the purpose of supplying such data through determination of the organic iodine concentration of serum in a large group of young, middle-aged, and old individuals. In addition to a determination of the serum protein-bound iodine measurement of the basal metabolic rate and the serum cholesterol content were likewise performed and the results of the various determinations compared.

Reports on the concentration of protein-bound serum iodine in old individuals do not yet appear to have been published. In an investigation of 66 non-cretin children, Man, Culotta, Siegfried, and Stilson (4) in 1944 found a range of organic iodine in serum from 3.7 to 7.9 micrograms per cent, whereas Taurog and Chaikoff (7) in a study of 6 normal adults observed values from 3.7 to 7.9 micrograms per cent. More extensive investigations concerning the normal organic serum iodine value are available from the Massachusetts General Hospital. In a summary of results obtained in normal individuals and in patients with thyroid diseases Riggs (5) concludes that the serum protein-bound iodine of euthyroid individuals falls in the range of 3.5 to 7.0 micrograms per cent, values which are in good agreement with the figures given by Taurog and Chaikoff. According to Riggs in hypothyroidism values below 3.0 micrograms per cent are characteristic, and in outspoken myxedema concentrations below 1.0 micrograms per cent are often encountered. The correlation observed between the serum organic iodine content and the basal metabolic rate, however, on the whole was not very close.

METHODS

Determination of serum protein-bound iodine was made by the procedure of Chaney

Dr. Kountz received his M.D. degree from Washington University in 1926 and served for a year as intern at Barnes Hospital and three as assistant and instructor at the Washington University School of Medicine. After a year in Egypt, England, and Germany as National Research Council Fellow, he returned to the Washington University School of Medicine as instructor and became Assistant Professor of Clinical Medicine in 1939. He is also connected with the Division of Gerontology at that University as Director of Clinical Services and is consulting physician to Barnes Hospital, Lutheran Hospital, and St. Louis City Infirmary Hospital. He is a member of the Society for Clinical Investigation, the Central Society for Clinical Research, and the Gerontological Society, and his chief interests are geriatrics and cardiovascular diseases.

Dr. Chieffi is Research Assistant at the Division of Gerontology, Washington University School of Medicine. She obtained her M.D. degree from the University of New Zealand in 1938 and from 1940 to 1946 was on the staff of the Forlanini Hospital of the University of Rome. She was authorized as a specialist in chest diseases in 1944 and held the position as Instructor in Pulmonary Diseases at the University of Rome from 1944 to 1946. Her chief interests are in the fields of chest diseases and gerontology.

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(3) in the modification of Taurog and Chaikoff (7). The average error of the method in duplicate colorimetric estimations was 5.3 per cent. Even though a special room was used for the iodine analysis, both the distillation and the catalytic colorimetric stages of the procedure were found to be subject to frequent interferences with the reliability of the assay which necessitated repeated checking of the reagents with recovery experiments, scrupulous cleaning and storing of glassware, and unfailing vigilance.

The B.M.R. determinations were performed by means of a Sanborn apparatus, the reliability of which was ascertained by alcohol combustion checks. In order to obtain complete relaxation during the test .09 gm. of seconal was given to the older patients at midnight. For serum cholesterol estimation a modification of Bloor's (2) procedure was used.

Experimental

Serum organic iodine, cholesterol, and basal metabolic rates were measured in 141 individuals, 78 men and 63 women, between the ages of 25 and 100 years. Most of the subjects were inmates of the St. Louis City Infirmary Hospital. Patients with Graves' disease, myxedema, hypertension, nephritis, cardiac failure, diabetes and syphilis, and patients who had received iodine or thyroid medications were excluded from the study.

In table 1 the mean organic iodine values are listed for the various age groups for the men and women separately. The table shows a definite decrease in the mean organic serum iodine value of the men with advancing years, whereas in the female group no definite change in the iodine value is observed with age. These findings would indicate a decreased thyroid function in the men with increasing age.

The observed values for the basal metabolic rate expressed in calories per square meter of body surface per hour are presented

TABLE 1. THE CORRELATION BETWEEN AGE AND SERUM PROTEIN-BOUND IODINE IN 78 MEN AND 63 WOMEN

	Men			Women		
Age	No.	Mean organic Iodine in serum microgram %	s.d.	No.	Mean organic Iodine in serum microgram %	s.d.
25–39	9	5.1	2.3	10	4.5	1.4
40–59	25	5.7	2.6	15	4.9	2.2
60–69	19	4.6	2.0	15	5.0	2.4
70–79	16	4.2	1.5	15	4.7	1.9
Above 80	9	3.3	1.3	8	3.8	2.2

in figure 1 for the men and women separately. As would have been expected the values show a gradual and regular decrease in the oxygen consumption with age. The dotted lines on the figure indicate the standard normal value, the solid lower lines parallel with these are drawn between the mean values observed by us in the different age groups. The mean basal metabolic values for the subjects included in this study are therefore on the whole somewhat lower than the normal values derived from the accepted standard tables, but show essentially the same percentage decline with age.

In table 2 the observed mean values for the serum protein-bound iodine have been

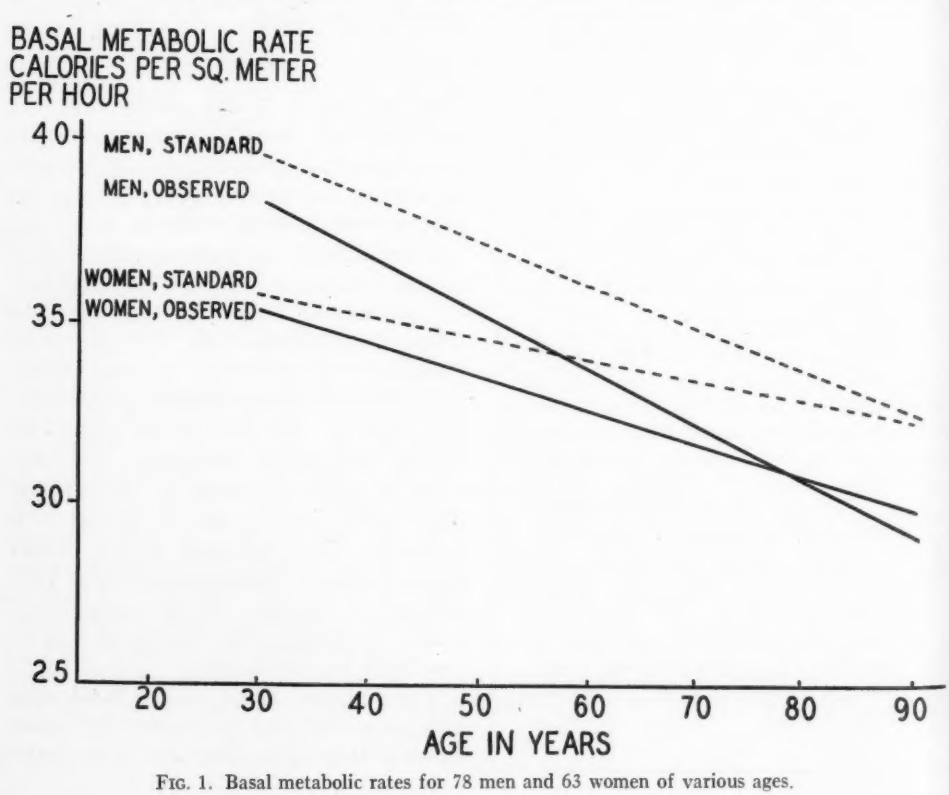

FIG. 1. Basal metabolic rates for 78 men and 63 women of various ages.

listed for the men and women separately against the oxygen consumption expressed in calories per square meter per hour. The table shows a definite correlation for the men between the oxygen consumption and the organic serum iodine concentration in the oxygen consumption calculated per square meter of body surface. In the men a significant correlation was found between the oxygen consumption and the serum organic iodine values, whereas no such correlation was evident in the case of the women.

TABLE 2. THE CORRELATION BETWEEN BASAL OXYGEN CONSUMPTION AND SERUM PROTEIN-BOUND IODINE IN 70 MEN AND 58 WOMEN

	Men			Women		
Calories per sq. meter per hour	No.	Mean organic Iodine in serum microgram %	s.d.	No.	Mean organic Iodine in serum microgram %	s.d.
25–29	12	3.6	1.3	17	4.5	2.9
30–34	25	4.6	1.6	24	4.8	1.8
35–39	23	5.4	3.0	17	4.7	2.0
40–45	10	5.4	2.1			

(coefficient of correlation + 0.33), whereas such correlation is not evident in the case of the women (coefficient of correlation — 0.08).

The average serum cholesterol concentration observed in the male subjects in this study was 250 mg. per cent (s.d. 44 mg. per cent) and in the female individuals 260 mg. per cent (s.d. 53 mg. per cent). No certain correlation was found between the serum protein-bound iodine concentration and the cholesterol content, the coefficient of correlation iodine/cholesterol being + 0.09 in the men and — 0.11 in the women.

The organic iodine value of serum showed no correlation to the serum cholesterol level in either sex.

The findings support the assumption of a decreased thyroid function in the men with age.

SUMMARY

A study was made of the serum protein-bound iodine, serum cholesterol, and basal metabolic rate in 141 individuals, 73 men and 68 women, between 25 and 100 years of age. The average organic serum iodine value was 4.8 micrograms per cent both in the men and the women. In the men a gradual decrease in the organic serum iodine concentration was found with advancing years, whereas in the women no certain correlation between age and iodine concentration was noted. In both sexes a gradual and regular decline with age was observed

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Submitted for publication February 28, 1949
The senior author's address is:
DR. WILLIAM B. KOUNTZ
DIVISION OF GERONTOLOGY
WASHINGTON UNIVERSITY SCHOOL OF MEDICINE
ST. LOUIS 9, MISSOURI

Distinctive Features of Coronary Disease in the Aged

ERNST P. BOAS

THIS PAPER WAS PRESENTED AT THE FIRST ANNUAL SCIENTIFIC MEETING OF THE GERONTOLOGICAL SOCIETY, INC. ON INVITATION OF THE PROGRAM COMMITTEE AS A PART OF A SYMPOSIUM ON THE PSYCHOLOGIC AND SOCIOLOGIC ASPECTS OF AGING. DR. BOAS DISCUSSES ARTERIOSCLEROSIS AND CORONARY DISEASE WITH REGARD TO AGE AND SEX, HEREDITY, AND ANATOMICAL INCIDENCE AND SUGGESTS THE NEED FOR STUDY OF CHOLESTEROL METABOLISM AND THE POSSIBLE EFFECT THE SEX GLANDS MAY HAVE UPON IT.

THE manifestations of coronary artery disease in elderly persons differ in certain respects from those in the young. Analysis of these differences may yield some clues to guide future investigations into the causes of arteriosclerosis. Most physicians agree that atherosclerosis is not an inevitable manifestion of the aging process but that it is a disease that occurs in the young as well as the old and that an important element in its genesis is a disturbance of the cholesterol metabolism. These conclusions are based on the following facts (2):

1. Hereditary xanthomatosis, a disease that is characterized by a disturbed cholesterol metabolism, almost invariably is accompanied by atherosclerosis, and coronary artery disease is the most frequent cause of death. Subjects suffering from this disorder exhibit arterial changes at early ages. A growing number of observers have noted hypercholesterolemia in many patients with coronary artery sclerosis, and it has been demonstrated that among patients with coronary artery disease fluctuations in serum cholesterol levels from month to month are much greater than in normal persons who maintain a relatively constant level through the years. Coronary arteriosclerosis is encountered in young children with lipoid nephrosis and high blood cholesterol figures; it is the rule in persons with myxedema in whom the blood cholesterol is also elevated.

2. The great frequency of arteriosclerosis in diabetes and the fact that in contrast to the rest of the population diabetic women suffer from arteriosclerosis as often as do diabetic men is probably related to the disturbance of lipoid metabolism that accompanies this disease.

3. The arcus senilis, which is due to a cholesterol deposit in the cornea, occurs in young persons with hypercholesterolemia, and there is a correlation between the occurrence of the arcus and coronary disease in the same person.

Experimental support for these clinical observations is found in the famous work of Anitschkow (1) who produced lesions resembling human atherosclerosis in rabbits by feeding them cholesterol dissolved in oil. Similar lesions have been produced in chicks, and most recently atherosclerosis has been induced in dogs by inhibiting the action of the thyroid gland by the administration of thiouracil while feeding them cholesterol.

There is much suggestive evidence that dietary factors may affect the development of atherosclerosis. Coronary artery sclerosis

Dr. Boas received his M.D. degree from the Columbia University College of Physicians and Surgeons in 1914. Following service in the army as a cardiovascular specialist in the first world war, he served as medical director of the Montefiore Hospital from 1921 to 1928 and as assistant clinical professor of medicine at Columbia University from 1936 to 1948. In addition to his work as associate physician at Mount Sinai Hospital which he began in 1929, Dr. Boas is in private practice as an internist cardiologist.

Dr. Boas is a member of the American Medical Association, the Society for Clinical Investigation, the Harvey Society, the New York Academy of Medicine, and the New York Heart Association and has published various books on geriatrics and diseases of the heart and arteries.

occurs less frequently in Negroes, northern Chinese, and Okinawans than in Whites. It is said to be uncommon among the natives of Chile, Ecuador, and Kenya, as well as among the Malays. The northern Chinese have a low blood cholesterol content, and they consume no dairy foods—no milk, cream, cheese, or eggs. It would seem that this apparent racial disparity in the incidence of arteriosclerosis might be due to differences in diet. Some support for this view is found in observations made in Sweden where much more arteriosclerosis is encountered in Stockholm and in the Skane province where the standard of living is high than in Norrland where the people are in large part poverty-stricken. In Sweden deaths from arteriosclerosis decreased in the early 1930's and again in 1942 and 1943. The first period corresponds to an economic depression, the second to war years during which food, especially fats and meats, were scanty.

The fact that death rates from angina pectoris among persons who are overweight are double those of persons of normal weight offers confirmation of the significance of dietary factors. Ninety-one per cent of young soldiers who died of coronary artery sclerosis were overweight, and autopsy studies have shown that atherosclerosis, including coronary sclerosis, is over twice as common in the obese as in the poorly nourished. This relationship is independent of age, sex, and blood pressure. On the other hand atherosclerosis is uncommon in patients who have succumbed to wasting diseases. It seems as though in them the atheromatous deposits had been resorbed, that their atherosclerosis had been a reversible process.

All of this evidence points in the same direction and suggests that the basis for the development of arteriosclerosis lies in a disturbance of the cholesterol metabolism. This disturbance may be caused or aggravated by dietary factors, or it may be inborn and hereditary.

In view of this evidence let us examine some of the differences in the manifestations of coronary arteriosclerosis as it occurs in the young and the old.

Age and sex.—The incidence of coronary artery disease is about five times as great in men as it is in women. After the age of 60 coronary artery sclerosis without accompanying hypertension or diabetes becomes increasingly common in women, and the ratio of incidence between men and women is 2 to 1. On the average coronary disease in women develops later in life than in men. Only 5 per cent of patients under the age of 40 with coronary disease are women. Whereas about one-half of all men with coronary disease have no coexisting hypertension or diabetes, in women coronary disease is unusual in the absence of one of these two disorders.

Heredity.—There are no accurate statistical studies of hereditary factors in coronary artery disease, but clinical observation discloses a strong familial tendency to the development of coronary artery disease. Multiple cases among siblings and in parents and their children are common. Coronary artery sclerosis is especially apt to occur in persons both of whose parents are affected. Together

with Parets and Adlersberg (3) I have studied the serum cholesterol levels of 122 patients in whom the symptoms and signs of coronary disease developed before the age of 50, as well as of the siblings of 50 of these patients. Hypercholesterolemia was found in 58 per cent of the patients and in all or most of the siblings in one-third of the families that were studied. In 9 more families one-half of the siblings exhibited hypercholesterolemia.

These observations, together with similar studies made on families stigmatized with xanthomatosis and coronary disease, point to hypercholesterolemia as the basic inherited factor predisposing to atherosclerosis.

In the case of older persons with coronary artery sclerosis hereditary factors are less evident, and familial heaping of cases is not the rule (7). Blood cholesterol studies of older persons with coronary artery disease are inadequate. In a recent study of 200 consecutive cases of coronary thrombosis the blood cholesterol was over 260 mgms. per 100 cc. in 68 per cent of those under age 60 but in only 48 per cent of those beyond this age (6).

Anatomical features.—Autopsies of young men who have died from coronary arteriosclerosis reveal that the atherosclerotic process is largely confined to the coronary arteries and does not involve the other visceral arteries. There is little information in the literature on the organ distribution of arteriosclerosis at different ages. Wartman (11) noted the distribution of arteriosclerosis in the arteries of the heart, lungs, spleen, kidney, liver, pancreas, brain, gastrointestinal tract, and adrenal glands in 500 autopsies. In males under age 30 the coronary arteries were markedly atherosclerotic in 3.4 per cent, and the only other artery involved was the splenic in 13.8 per cent. In those 30 to 59 years of age the incidence of coronary sclerosis rose to 18.2 per cent, and the arteries of all of the other organs were affected to a still greater degree, varying from 8.9 per cent for the liver to 62.5 per cent for the spleen. In men over 60 coronary sclerosis occurred in 58.8 per cent, and all of the other organs were still more frequently involved up to as high as 84.9 per cent for the spleen and 91 per cent for the liver. The incidence of arteriosclerotic lesions in women followed approximately the same pattern, but there were some differences.

Mönckeberg (5) in his studies on atherosclerosis among young soldiers in the first world war observed atherosclerosis of the coronary arteries in about 50 per cent of autopsies and noted that except for the aorta other parts of the arterial system were free from atheroma. In an autopsy study of 450 soldiers between the ages of 18 and 39 of World War II who had died of coronary artery disease Yater (12) found little arteriosclerosis in the other arteries of the body and concluded that coronary artery sclerosis in his series was a specific disease of the coronary arteries and not part of a generalized arteriosclerosis. Yet the atherosclerotic lesions of the arteries are the same in young and old.

In a study of coronary artery disease among workers made in 1932 (4) I encountered a large number of patients under the age of 50 and suggested at the time that in the younger group coronary disease occurs in vigorous men who give few other indications of arterial disease, but who may have hypertension, and pointed out that in them the cardiac lesion stands out as the only evidence of disease.

In the elderly coronary artery sclerosis is part of the general picture of general arteriosclerosis, and the clinical manifestations of coronary disease appear to be an accident in the course of a general arteriosclerosis.

The immediate prognosis following myocardial infarction is more favorable in the young than in the old. This has nothing to do with the nature of the arteriosclerotic process. The increased death rate at older ages is in itself a manifestation of aging due

to loss of resistance to disease as a result of the underlying aging process (10). For the same reason, and because of the accumulation of other bodily defects, complications are more frequent among elderly persons with coronary arteriosclerosis.

The average duration of life after the diagnosis of coronary disease has been made is about 10 years, therefore most patients who develop symptoms of coronary disease before age 50, that is those with solitary sclerosis of the coronary arteries, die before they reach age 60 and do not live long enough to develop advanced generalized arteriosclerosis. Patients who are older when they first develop symptoms of coronary artery disease do not have precocious sclerosis of these vessels but rather a generalized arteriosclerosis.

Attempts to explain these differences in the behavior of coronary artery disease in the young and old for the present remain in the realm of theory, but speculation may yield leads for further investigation.

Is coronary sclerosis in the young an expression of a serious derangement of cholesterol metabolism, and may arteriosclerosis in the elderly result from the gradual effects of a much more indolent metabolic disturbance? Anitschkow (1) has emphasized the time factor and has indicated that "the genesis of atherosclerosis depends not only on the intensity but also on the duration of the cholesterin congestion that is present in the organism." Can an analogy be drawn between the characteristics of diabetes and hypertension which are severe and progressive in the young and mild in the aged.

Do the sex differences in the development of coronary artery sclerosis indicate that the internal secretory glands are concerned with cholesterol metabolism and the genesis of arteriosclerosis? Certain experimental evidence suggests that this may be so.

Does the answer lie not in the nature of the metabolic disturbance, but rather in the heart? What determines that atherosclerosis in the young localizes chiefly in the coronary arteries? Is it due to the fact that physiologic thickening of the intima develops earlier and more rapidly in the coronary arteries than in other vessels? If so, then why are so many persons spared the ravages of arteriosclerosis at early ages? Those who succumb at early ages to coronary disease might have the anatomic coronary pattern described by Schlesinger (8) in which the blood supply to the heart is derived predominately from the left coronary artery, and which is associated with such a high mortality when coronary occlusion takes place. Persons who survive to older ages and develop generalized arteriosclerosis might have the more beneficent coronary pattern in which the blood supply of the heart is balanced between the right and left coronary arteries. However this theory is incorrect for Dr. Schlesinger informs me that analysis of the coronary patterns of 1,000 cases reveals about the same distribution of left, right, and balanced coronary circulation at all ages (9).

Anatomic mechanisms do not explain the sex differences in the prevalence of arteriosclerosis nor the increased incidence of coronary artery sclerosis in older women and in persons who develop diabetes. Even if the inheritance of unfavorable anatomic coronary patterns plays some role in determining the familial incidence of coronary disease, this offers only a partial explanation of hereditary factors.

Knowledge is needed of the distribution of arteriosclerotic lesions at different ages; the causes for their early localization in the blood vessels of the heart; and the incidence of hypercholesterolemia among the several age groups. Above all a more basic understanding of the cholesterol metabolism in the human body must be achieved.

Summary

Differences between the clinical picture of coronary atherosclerosis in the aged and

in younger persons are discussed. It is suggested that study of the cholesterol metabolism and of the influence upon it of the internal secretory glands, as well as investigation into the causes of localization of atherosclerosis in different arteries in various age groups, may throw further light on the whole problem of atherosclerosis.

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The author's address is:

Dr. Ernst P. Boas

1185 Park Avenue

New York 28, New York

Attitudes of the Older Population Groups Towards Activity and Inactivity

EDRITA G. FRIED

FROM THE RESULTS OF A STUDY OF THE ATTITUDES TOWARD RETIREMENT OF 75 INDIVIDUALS, DR. FRIED DISCUSSES THE INCIDENCE OF ACTIVITY AND INACTIVITY ACCORDING TO SOCIO-ECONOMIC STATUS, MOTIVES FOR WORKING AGAIN, AND EFFECTS OF RETIREMENT AND STRESSES THE ADVISABILITY OF ADEQUATE PREPARATION FOR RETIREMENT.

IT IS a matter of common knowledge both among scientists and laymen that our older population groups face some of their most serious difficulties in the field of occupational activities. Inasmuch as these difficulties are due to economic factors they must be referred to other faculties for investigation. However, to the extent to which they derive from psychologic attitudes, entertained on the one hand by the older people themselves and on the other hand by their environment, they represent an object of urgent study for us.

Because of a number of previous discussions the nature of some major problems has been outlined: the reluctance of employers (5, 8) to use older personnel, caused partly by ignorance of compensatory developments within the older person; the failure of many aging individuals to prepare for activity adaptations during the time of declining strength (6), and finally a conspicuous reluctance on the part of our older people to submit to a development towards increased passivity (4).

It is the purpose of the present study to make a contribution towards a more detailed and more specific analysis of these and some other factors by presenting data from the case histories of 75 individuals who were interviewed in detail. Though many external facts were recorded, the aim of the project was chiefly to analyse psychologic aspects, such as hopes, fears, and inner conflicts of the old people. The factors which were examined are: actual extent of activities, attempts at adaptation of activities to psychophysic condition, and retirement.

METHODS

The 36 men and 39 women in the sample were between 50 and 80 years old and distributed so that there were 39 persons in the involutional phase (50 to 64 years) and 36 persons in the post-involutional phase (65 to 80 years). In order to examine the influence of socio-economic factors, care was taken to control the socio-economic composition of the sample so as to allow all classes to be represented, with lower and middle class status prevailing in the sample in accordance with the situation among the national population.

TABLE 1. COMPOSITION BY SOCIO-ECONOMIC STATUS

Socio-economic Status	Men Percentage	Women Percentage
Lower class	38.9 (14)	38.4 (15)
Middle class	38.9 (14)	38.4 (15)
Upper class	22.2 (8)	23.2 (9)
Total	100.0 (36)	100.0 (39)

Dr. Edrita G. Fried received her Ph.D. degree from the University of Vienna in 1934. From 1940 to 1943 she served as research assistant on projects sponsored by Princeton University and Columbia University, and for the two following years she was study director for Columbia Broadcasting System, conducting studies on audience reactions. In 1945 Dr. Fried became research assistant at the Allan Memorial Institute of Psychiatry, Gerontological Unit, McGill University, and in 1947 she became research associate at the same institution. Last year she collected material in the United States zone in Germany for various studies, including the development of conscience (super-ego formation) in German youth. Her chief interests are in the fields of social psychology, semantics, gerontology, and psychoanalysis.

Extent of Activities

As long as the group is viewed as a total (See table 2), a relatively large portion of the individuals (65 per cent) appear engaged in regular activities. However, a class breakdown, as presented in the same table, shows that the situation differs very much for the three strata of the population and that the percentage of inactive lower class individuals is about six times larger than the percentage of inactive men and women in the middle class.

Analysis of the case histories shows that in the middle and upper classes a state of complete inactivity—relatively infrequent as it is—does not entail as serious problems as among the lower class group. Only one-third of the inactive subjects in the lower class group are satisfied to accept their passivity (the women who used to be in domestic service, some housewives, and one unskilled worker). All of these persons were physically exhausted by their obligations which, moreover, brought them no personal satisfaction and thus they were glad to retire when the opportunity was given them.

As far as the other unoccupied individuals in the lower class category are concerned they do not like to be inactive and several are so acutely disturbed by the enforced inactivity that the desire to work again attains the nature of an obsession. Their preoccupation with the problem of inactivity leads them to speak incessantly about the lack of occupation and to turn to this aspect of their lives, no matter which question regarding their way of living is put before them.

The urge to engage again in some regular activity does not appear to be motivated primarily by economic necessity. Only three subjects in the lower class bracket wish primarily for work because of economic considerations. Interestingly enough the majority who seek occupation have a modest measure of self-earned security, while on the other hand all of those who are satisfied with their passivity live rather scantily on

Table 2. Activity Schedule

	Total Group Percentage	Lower Class Percentage	Middle Class Percentage	Upper Class Percentage	Involutional Group Percentage	Aged Group Percentage
Performing regular gainful activities†	57.3 (44)	35.0 (11)	79.0 (23)	58.9 (10)	82.0 (32)	33.3 (12)
Performing activities that are regular but not gainful‡	9.3 (7)	.... ..	10.5 (3)	23.5 (4)	5.1 (2)	13.9 (5)
Inactive	33.4 (24)	62.0 (18)	10.5 (3)	17.6 (3)	12.9 (5)	52.8 (19)
Total	100.0 (75)	100.0 (29)	100.0 (29)	100.0 (17)	100.0 (39)	100.0 (36)

† Includes such activities as social service duties, provided they consume an average of at least three hours a day.
‡ Housewives are included if duties consume at least three hours a day.

support from the outside such as charity, government pensions, or contributions from their offspring. The cases histories make it clear that the chief motivations for the frequently obsessive demand for work is the need to maintain self-esteem, to escape from morbid self-preoccupation, and to cope with inner restlessness.

The important difference between work sought and carried out on a compulsive basis and work undertaken without compulsion has been pointed out by Karl Menninger (7). Although casual work also serves as an outlet for a certain amount of aggression, in the case of compulsive work the quantities of aggression discharged are infinitely larger, and prior to release they are frequently manifested as restlessness. From the comments quoted it will be seen that it is the unpleasurable experience of unreleased restlessness that is a particularly powerful motivating factor for the work demand.

Mr. D.: (61, former cutter of men's clothes) "I would sooner work than spend money. Why, because I can't sit still. Saturdays at home—I used to be off on Saturday—I chopped wood to keep busy. Not working is not living. I get so restless I could crawl up the walls. I don't respect myself if I don't work and I feel no one else does."

Mr. M.: (80, clerk up to six months prior to interview) "I tell you what will happen if I don't find a job. It'll finish me. A man needs to work to keep his mind off himself and to keep from getting fidgety."

Mr. D.: (59, former dining car steward) "Since I have stopped working I have got nothing to live for. I know if I go along as I do now without anything decent to do, I will be pushing up the daisies 10 years from now. I can't get even a few hours sleep since I stopped working. I am so restless I can't seem to drop off and there is nothing to take the restlessness out of me."

It is not only external factors, such as a shorter employment span, which makes the situation so particularly difficult for the lower class subjects but also factors of a personal nature. Only 21 per cent of the men and women in the low income brackets have acquired any well defined interest or skill outside the trade with which they earn their living. Hence when gainful activity ceases they are in a less favorable position to make a shift to some other activity which might absorb and if necessary sustain them. Added to this is the fact that although economic compensation appears frequently not to be the chief motivating force in the search for work, it is important to the lower income groups for psychologic reasons to be paid for their activities. In order to promote self-esteem an occupation, according to the mores of their class, should bring in monetary reward. As a former policeman put it, "I sure feel that it is my duty to serve in our committee. I liked organizing the 'clothes for Europe drive,' but unless I can also make some money I think I am no good."

The urge to revert from a state of inactivity to a state of gainful activity assumes the nature of an obsession in all cases, regardless of class, where the subject has become inactive through one of the following unexpected events:

> Dismissal without warning (firing),
> serious illness, forcing the individual to abandon his position, or
> discontinuation of the organization within which the subject was employed, for instance bankruptcy, or unexpected inability of individual employer to continue employment of subject.

One gains the impression in studying the case histories of individuals who were forced into a state of idleness through any of these causes—in some cases the reported experience lay well in the past and had been superseded by new-found activities—that these persons feel compelled to counteract the shock they experienced. They seek so urgently for new activity in order to be able to say, "There are no inescapable forces that keep me from working. This time I shall quit of my own volition or after due warning."

Under the circumstances which have been described it is to be expected that the older age groups try to carry on some form of occupation or other for as long as possible.

Table 2 allows a comparison between the extent of activity in the involutional and the aged group. The figures show that even among the people between 65 and 80 almost half (47 per cent) are still engaged in activities of a regular nature. It may be added that all but two of the aged individuals who are still active are satisfied to be occupied.

Adaptation to Changing Working Capacity

It is assumed in a general fashion that the working capacity of an individual, representing an intrinsic part of the total personality, is affected by the varied and deep-going changes which occur in the course of the aging process. However, the specific changes which the working capacity undergoes are only known in a fragmentary manner. Both experts and laymen, for instance, are more familiar with what one might term the quantitative changes than with the qualitative ones. That is to say, such phenomena as the gradual decrease of physical strength or of reaction speed are widely recognized and determine employment policy on the one hand and the individual's self-evaluation on the other.

However, *modifications of abilities*—as distinguished from a quantitative decrease of energy—have been insufficiently investigated and receive scant consideration when it comes to making practical decisions. As an example of the fragmentary approach it may be pointed out that while it is generally conceded that learning ability suffers with age there has been relatively little attention to such compensatory developments as increased generalization or transfer, as Miles (2) calls it. Older people not only possess a wider range of experience but as the term transfer indicates are also more adept at the technique of utilizing previous experience for the solution of a specific new situation.

As far as industry is concerned there exist as yet not even the beginnings of a systematic policy for extracting benefits from the changing abilities of the aging person, as Giberson (1) advises.

In other fields of occupation some isolated efforts by employers exist but the total situation is not much better. Nor do the aging and old persons themselves appear to be heading towards an organized, planned program of work adaptation. The case histories show that the few adaptations which actually occurred were mostly performed under external pressure, such as serious illness or other disruptive processes and they were confined to the middle and upper classes.

The prevailing pattern is a rather rigid perseveration within the orbit of obligations undertaken during youth and middle age.

Since work adjustments can be both quantitative and qualitative, the following possibilities can be assumed: an individual decides to *cut down* on the amount of work and makes a transition from a full time to a part time working schedule, or decides to *modify* the nature of his activities. In the latter case he will most likely try to make possible an arrangement which permits a greater use of judgment and experience—the assets of the older person—and which makes minimum demands on speed. Part time schedules which do justice to reduced physical endurance are infrequent among the group as a whole. Moreover since the percentage of part time arrangements in the older group is not significantly higher than the percentage in the involutional group we cannot speak of a progressing tendency to respond to the symptoms of aging with a gradual reduction of working time.

Table 3. Part Time and Full Time Schedules

	Active Involutional Group Percentage	Active Aged Group Percentage
Full time schedules	67.6 (23)	64.7 (11)
Part time schedules	32.4 (11)	35.3 (6)
Total:	100.0 (34)	100.0 (17)

All but two of the individuals included in the part time schedule group listed in table 3 belong in the middle and upper class. The individuals in these categories are more frequently their own boss and can therefore dictate their own terms. Moreover their obligations usually consist intermittently of team work and individual work of which the latter can be spaced at the individual's convenience. Also certain psychologic considerations which will be discussed make it more difficult for the lower classes to put part time work on a par with full time work.

Actually the desire for part time arrangements surpasses the existing number of such schedules. However, although there is an unsatisfied demand for part time schedules —as table 4 shows 22 per cent who would like them do not have them—the percentage of those who want to persist in the accustomed tracks of an eight or ten hour working day comprises almost half the sample.

TABLE 4. DESIRE FOR VS. INCIDENCE OF FULL OR PART TIME SCHEDULES

	Total Group (except Housewives*) Percentage
Prefer full time	49.0 (27)
Prefer part time	51.0 (28)
Total:	100.0 (55)
Active full time	70.9 (39)
Active part time	29.1 (16)
Total:	100.0 (55)

*) Housewives among the older age groups are not included because if active at all their schedules occupy automatically only part of the day.

The preference by 49 per cent of the active individuals for a full time work program has both economic and psychologic reasons which are discussed below in the order of frequency with which they appear in the records.

1. The case histories show that the urge to become more passive and to refrain from energy expenditure becomes very strong towards the end of the fifties. Hence there is the feeling that a partial let-up might merely represent the first step towards a complete decline of the capacity or the desire to remain active, or of both. At the same time the individual feels a need for activities as a basis for self-esteem, expression of the creative urge, an outlet for aggression, a protection against self-preoccupation and depression so likely to occur in the involutional period. (In the present group depressive tendencies were reported and observed directly in the subjects and also revealed in their Rorschach records.) Under the impact of this conflict the tendency is not only to avoid a let up, however moderate, but even to take refuge in an intensified program of duties. The subjects surround themselves with a system of compulsions that drive them into activity. The purpose, as in the case of any compulsive behavior (2) is to avoid tempting situations as well as all traces of the repressed desire, in this case the wish to take it easy.

2. Economic considerations are in favor of a full working day.

3. Comparable to the aforementioned devaluation of unpaid work there is a tendency among some people in the low income brackets to regard part time work as inferior and therefore less adequate as a basis for self-respect and prestige.

4. A number of individuals who achieved status late in life feel that any reduction of their activities would deprive them of the fruit of their efforts.

As to adaptations regarding the nature of the pursued activities rather than the time schedule, such qualitative adaptations occur infrequently on a voluntary basis and even under pressure they do not happen often.

Of the 5 individuals who switched voluntarily to form of occupation which were more in keeping with their age, 4 appear to be particularly well adjusted persons who followed their inclinations as they grew older. The fifth proves to have been preoccupied obsessively with the thought of his

TABLE 5. TURNING TO ACTIVITIES BETTER SUITED TO THE CAPACITIES OF THE AGING INDIVIDUAL

	Total Group (except Housewives*) Percentage
Shift was made without external pressure	9.1 (5)
Shift was made under external pressure	16.3 (9)
No shift made	74.6 (41)
Total:	100.0 (55)

*) The situation among the housewives is discussed separately. Inactive individuals are included on grounds of their past records.

approaching age. The shift he made was clearly a defensive move to forestall any pressure from outside. The histories of the five individuals are summarized briefly below.

Mr. J. is 60 years old and used to be a skilled repair worker on a railroad. As the work became too heavy for him he tried to find a more sedatory activity. His long standing interest in union activities led him to union headquarters where he was hired for secretarial work. Mr. J. feels that with the new job which allows for a certain amount of initiative life started all over for him.

Mr. J. now 61, acted in vaudeville until the age of 54 when he decided that he was getting too old to travel and that his performance was not up to par. He found himself a job as a bartender in a town through which he had passed in his vaudeville days. He likes his job very much because it satisfies his need to "be in a crowd."

Miss N. is 65 years old and used to be secretary of a Y.W.C.A. until she realized that the young members of the organization hesitated to come to her with their problems because they thought she would not understand them. She resigned and opened a rooming house for students in another part of the country. She enjoys her motherly role as a hostess to the young people and the relative freedom from routine duties.

Miss M. is 64 and was a high school teacher until she found that her work consumed too many of her evenings (correcting papers, meetings, etc.) and that she was getting impatient with the young people. She moved away from her home town and took charge of a club house devoted to welfare work. She prefers the work with people closer to her own age and the more leisurely hours.

Mr. A. is a man of 70 who used to be a research chemist. Already at the age of 40 he began to worry about his old age. To be prepared for all eventualities he took up both painting and music, painting for the event that his hearing might be impaired and music in case his eyesight might fail him. At 60, Mr. A felt he was getting to be slow in his work and quit his job to avoid dismissal or enforced retirement. He has since devoted himself primarily to painting on a regular time schedule and enjoys it.

In all instances the activity changes were experienced as improvements. Analysis of the shifts which were performed under pressure—because of illness, because a certain age limit had been reached, and so forth—show that adjustments are more difficult. Although in the middle and upper class group the changes usually entail a predominance of advisory over routine activities, they are resented because they are experienced as an expression of failure on account of the external pressure applied.

While only 5 individuals made voluntary adjustments, the number of persons who feel— or felt during their active years—that a change would be good for them and who have—or had—specific changes in mind is considerable. Several individuals felt that they could make a change more easily if they could move to another environment (in fact three of the five aforementioned persons who actually performed activity adjustments began their subsequent careers in new neighborhoods). The following comments illustrate the wish for a fresh start in a different part of the country.

Mr. A. (55, president of a medium-sized firm) "I often feel the wear and tear of this job is getting the better of me. I don't like to meet new business associates the way I used to. I would like to imitate a friend of mine. He packed up and went with his family to a small town. He is working with just one secretary there on his own terms, selling insurance when and if he likes."

Mr. C. (59, social worker in the East) "I can't think of anything I would rather do than go to the West Coast with my wife to live. I would like to start on something new there, maybe commercial gardening. I am tired of indoor life and human misery."

The desire to make an adjustment is greatest in the later fifties and appears to recede in the sixties. Only one subject who was over 60 said that he would like to change to activities of a different nature. Several others said that in their fifties they had toyed with plans of this kind but had eventually given them up.

In view of the data presented we may conclude that without encouragement from the outside the desire of a substantial portion of our aging population to perform activity adjustments will remain just a wish. As a consequence overwork and dissatisfaction will be considerable and the number of forced retirements, which are often disturbing, will remain high. It is to the individuals in their fifties that general counselling should be directed as well as concrete advice concerning alternative activities during the transition period into old age.

An interesting development was reported by 6 women in the involutional group. All 6 used to devote themselves exclusively to rearing their families and housekeeping, but in recent years they have taken up part time activities outside the home which represent either a resumption of their pre-marital career or a systematic application of a previously existing interest. One of these women has started to work outside the home because the death of her husband and provider made it economically necessary, while the other 5 found themselves with too much spare time on their hands and wanted to do something useful with it. For all 6 (age range from 51 to 62 years) the increase in activities outside the home has led to a very distinct feeling of self-confidence and happiness. In 4 out of the 6 a certain amount of exhaustion is reported, but the women feel that the satisfaction gained offsets such physical effects.

Mrs. H. (57, an unhappily married woman who has three children and used to be a nurse before her marriage) "Since I have gone back to nursing, I feel so satisfied. Sometimes I feel I never should have married at all. Wives are only safety valves for their husbands. Now I feel I am on my own and I have new confidence."

Mrs. H. (58, happily married, has one daughter and one grandchild, was trained as a social worker). "I went to work again because the Foster Home said they needed me. I shall hate to give it up. My husband and I are thoroughly good pals and if it weren't for all the satisfaction it gives me, he wouldn't stand for it."

Mrs. M. (51, has grown apart from her husband, has one son and two grandchildren, had no special training). "In the past 5 years since my son has not needed me any more I have gone out and done a lot of welfare work. I spend two days a week at the Jewish General Hospital, and I go to the Man's Center House once a week to cook. It make me less selfish. I feel almost as happy as when I was bringing up my boy."

It may be added that in the 5 cases where there was no economic pressure the suggestion to assume new responsibilities came from outside. This fact points again at the real need for guidance during the involutional period when obviously the susceptibility to suggestions is considerable.

Plans for and Effects of Retirement

The resistance to change which influences the older individuals against a reduction of working time and a modification of activities is also evident in the attitude towards retirement. Both among the active individuals who still have retirement ahead of them and among the inactive persons who have already withdrawn from working life retirement appears to be connected with many emotional difficulties. The tendency among the majority is to postpone the date of retirement as far as possible, to make no preparations for the post-retirement period, and to react with serious disturbances to retirement when it actually occurs.

The reasons for the widespread desire to continue work beyond the age of 65, which has become the accepted retirement limit in many industries, professional groups, and other organizations, are partly the same that prompt the older age groups to continue on full time schedules rather than part time working arrangements. Regular occupation

TABLE 6. AGE PERIOD AT WHICH RETIREMENT IS DESIRED

	Active and Inactive Group Percentage
Before 65	20.0 (15)
After 65	25.4 (19)
Want to go on indefinitely	54.6 (41)
Total:	100.0 (75)

*) The figures include all married women since several of them have regular remunerative occupations or are engaged in a regular routine of social service activities, and all have some idea as to when they would like to be relieved of major obligations in the home.

is the most common form of creative activity, and the need for creative activity is well known and has been discussed (4). The feeling that one is engaged in useful work contributes to the maintenance of self-esteem. Work helps to ward off self-preoccupation and depression. To some subjects their positions, whether honorary or remunerative, represent power which they are reluctant to relinquish, particularly if prestige was obtained late in life.

Two further factors which appear to contribute to the difficulties of retirement have not been discussed in the previous sections. An individual who lives within a family unit and who ceases to be a breadwinner faces an adjustment within his home. Certain changes of roles within the family are likely to occur and will be the more drastic and the more disturbing the less family solidarity there exists (1).

Secondly, lack of occupational success and a readiness on the part of the older individuals to accept the discrimination which their environment so frequently shows against the higher age groups appear to make retirement difficult. It is the unsuccessful person who has not been able to achieve his ambition and the person who whole or half-heartedly subscribes to the contention that old people belong on a shelf who clings most tenaciously to active working life. The interviews show that the persons in the first category are motivated by a strong wish to demonstrate that they can yet achieve success and similarly those in the second category want to disprove the theory of decline in the old which injures their self-esteem. By contrast these who are convinced of their value both as individuals and as older persons experience their task as completed and find retirement more easily acceptable.

The following comments will serve as illustrations for the various retirement difficulties mentioned.

Mrs. G. (59, working as assistant in a cancer research laboratory). "I want to continue for as long as my strength will last. I used to be so I was able to tell you what I would do a year from today. But now I am frightened and I just go from day to day hoping I can hold on. If I quit working I lose everything, my chance to do something with what God has given me, my balance and my confidence."

Mr. D. (59, former dining car steward, very depressed). "I get so impatient, I want to work more than anything else in the world. I have a son of 30. He lives with us and he keeps the home going. I don't have a home any more, just a house to live in. I used to provide well for my family; they always ate well. None of us can take it that I am no longer the one who pays for the food on the table."

Mr. C. (63, for the past 11 years advertising manager of a big evening paper, a very exhuberant person). "I have never had the ambition to be rich and the reason I want to stay in this job is not for money. My ideal is Mr. P., the former owner of our paper. He was 89 when he died and he quit work an hour before he closed his eyes forever. I want to keep on working till I stop breathing. I have watched a few men who stopped working in their sixties and did nothing. They disintegrated quickly. It has taken me long to get where I am. Why should I quit before I am told to go?"

Mr. R. (67, mechanic, has serious economic worries since he was told to quit his job on account of age, as well as difficulties of an emotional nature. "I have some ideas I want to develop, something I invented; I want to become a success yet and show my family. My life isn't half over. I never used to like old people working around me. It's like working with shadows. I never felt that they were 'there.' But I'll show them yet what a man my age can do."

In view of the growing present-day tendency in nearly all occupational categories to give preference to younger people, and to

advance rather than postpone the retiring age in many occupations it is clear that the desire of so many people to continue indefinitely in their activities must lead to serious difficulties. Even assuming a reversal of the trend towards discrimination against older people, retirement will be forced on the older age groups before they are mentally prepared to accept it. One possible remedy for this situation would be the adoption of outside post-retirement interests on a large scale.

Exemptions from the difficulties in facing retirement could be found in the following categories and for the reasons specified:

Domestic servants.—All those interviewed were already retired and all had tried to hasten retirement because they were physically exhausted and found no satisfaction in their work.

Housewives.—Three reported that they had desired complete leisure very much and obtained it abruptly when they fell ill and delegated their responsibilities to husbands and children. After partial recovery they did not resume their chores. Two other housewives who were still active at the time of interview spoke a good deal about their desire to be relieved of all responsibilities in the near future.

Unskilled labor.—One unskilled laborer who used to assist in construction work was relieved when at the beginning of his seventies he was admitted to an old age home which, according to his description, also served as a reformatory for prostitutes.

Clerks.—Three clerks—1 still active and 2 already retired—prefer retirement because of the total lack of satisfaction and indeed boredom of work performed in all 3 cases with great acclaim by superiors. All 3 clerks are entitled to pensions. An additional factor with the still active clerk is his ambition to write which he hopes to fulfill after retirement.

Professional individuals.—Four persons in this group are looking forward to retirement as their chance to devote themselves to their interests, such as politics, forestry, music, languages, and travel. Also all 4 anticipate with pleasure the more leisurely pace which retirement will make possible.

In our sample 24 individuals are already retired. Of these 10 were retired on a regular plan which was based on an age limit and entitled members to benefits after retirement. Steps had been taken to prepare the subjects for retirement by notifying them of the age limit. The other individuals had received no such advance warning. They were told without preparation that their services were no longer needed and on account of their age they did not find or thought that they could not find another opportunity for regular activities. All those retired were asked to discuss in detail the effects which retirement had on them. Their answers are tabulated below:

TABLE 7. EFFECTS OF RETIREMENT

	Effects mentioned* Percentage
Satisfaction	30.3 (10)
Ambivalent reaction	15.2 (5)
Depression (Sleeplessness, loss of appetite, apathy, suicidal ideals, etc.)	36.3 (12)
Serious illness	18.2 (6)

* Some subjects mentioned more than one effect.

Illness occurred primarily among individuals who had not been prepared for retirement. Four persons who did not anticipate dismissal fell gravely ill when they were told to quit as against 2 of those who retired on a regular and well publicized retirement plan. Depression also occurred more frequently among the unprepared than among the prepared group. Other authors have also discussed the incidence of depressions among old people who become inactive unexpectedly and remain without work (9). Satisfaction over retirement was reported

interestingly enough by 35 per cent of the unprepared group.

Inasmuch as advance notice of imminent retirement appears to be extremely significant for the maintenance of balance it is important to take note of repressive mechanisms which were mobilized by several persons who did not wish to retire. Five individuals who declared at first that they were entirely unprepared for retirement and who were extremely upset when it occurred revealed after further interviewing that the organizations with which they were connected had specific age limits for retirement of which all employees had been informed. However, such information was either forgotten, or, as actually happened in one case, the individual thought he was getting so old that it was "nonsense" to keep track of his years. Thus when he was told he had reached the critical age limit he reacted with total surprise and responded with a severe depression to the event. Another man who was well aware both of the retirement age limit in his organization and of his own age thought the boss would overlook or forget his age. This individual, too, was disturbed seriously when he was told to retire.

Summary

Seventy-five individuals between 50 and 80 years were interviewed with the intention to examine the prevailing attitudes towards activity curtailment, activity modification, and retirement. The individuals were drawn from all socio-economic strata of the population.

It was found that the percentage of inactive subjects in the lower class group was more than six times higher than in the middle class and almost three times higher than in the upper class group. The majority of inactive subjects in the lower class group desired to become active again. The chief motivations for the frequently obsessive desire for work were the need to maintain self-esteem, the wish to escape from self-preoccupation and depression, and the striving to combat inner restlessness.

The quest for occupation was particularly urgent where individuals had become inactive through one of the following events: dismissal without warning, serious illness, or unexpected discontinuation of employing organization.

Part time working schedules, which present one form of adaptation to the physical changes occuring with age, are the exception rather than the rule. They do not occur more frequently among the aged than among the involutional group. The desire for part time arrangement exceeds the actual number of part time accommodations. The reluctance to put this desire into effect is traced back chiefly to the fear of the aging individual that the partial let-up which part time work represents might tempt him to seek a state of total passivity which in turn threatens to lead to disintegration of the personality.

Qualitative adaptations of duties to the psycho-physical condition occur primarily among the middle class where they are always experienced as satisfactory. Again adaptations are more frequently desired than they are actually achieved. The wish to make an adaptation is most potent in the late fifties.

The tendency among the sample is to postpone the date of retirement, to give little precise thought to post-retirement plans, and to react to retirement with acute disturbances such as depression and illness.

In addition to reasons already mentioned in connection with the demand of the inactive person for new activities the following factors make it difficult to accept retirement: the individual who ceases to be the breadwinner must accept a shift of roles within the family. Unless there is a good feeling of solidarity such a change of position is extremely disturbing. Unsuccessful individuals and older persons who share with their environment the widespread devaluation of older persons have particular difficulties in retiring.

Individuals who were not prepared for retirement had more difficulties adjusting than those who expected to be retired. Persons who did not wish to retire took resort to such repressive mechanisms as forgetting the retirement age limit in their organization or even their own age.

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The author's address is:

Dr. Edrita Fried

Allan Memorial Institute of Psychiatry

McGill University

Montreal, Canada

Supportive Therapy in Geriatric Casework

RUTH LAVERTY

THIS PAPER WAS PRESENTED AT THF FIRST ANNUAL SCIENTIFIC MEETING OF THE GERONTOLOGICAL SOCIETY, INC. ON INVITATION OF THE PROGRAM COMMITTEE AS A PART OF A SYMPOSIUM ON THE PSYCHOLOGIC AND SOCIOLOGIC ASPECTS OF AGING. MRS. LAVERTY ILLUSTRATES WAYS IN WHICH MANY ELDERLY PEOPLE EXPRESS THEIR AGGRESSIVE TENDENCIES, SUCH AS BY REVERTING TO CHILDISH RESPONSES TO SITUATIONS, AND EMPHASIZES THE NEED FOR SUPPORTIVE THERAPY DESIGNED TO GIVE THEM SOME DEGREE OF EMOTIONAL SATISFACTION AND DIVERT THEIR AGGRESSIVE ENERGY INTO CONSTRUCTIVE CHANNELS.

GREATER recognition of the emotional needs of older people points up more sharply that some old people have little capacity to adjust well in an institutional environment no matter how comfortable or congenial that setting may be. Consequently the traditional concept of old age homes as the one and only solution for the aged who present housing, financial, social, or medical needs, is rapidly undergoing revision. Today's trend favors the development of a variety of additional resources with attention focused on the kind of service that more nearly fits the individual's physical and psychologic needs. Several recent projects involving boarding homes, nursing homes, foster homes, home care services, and extension of institutional care into the home, all report very encouraging results.

But many aged already living in institutions who have not had the benefit of an intensive initial study of their emotional needs are unable to adjust satisfactorily to their surroundings. Administrators are puzzled by the frequent eruptions of aggressive behavior and hostile reactions on the part of residents when everything is done to insure their comfort and contentment. The most frequent expressions are excessive and unrealistic demands, constant unwarranted complaints, rebellion against mild routine regulations, overanxiety over trivial matters, periodic regressions into infantile behavior, aloofness, lack of cooperation, petty quarreling, jealousy, supersensitivity, and perpetual criticism.

Casework study reveals that these manifestations are not always based on reality but are often reactivated responses to earlier life experiences. Attempts to seek gratification in certain ways in old age yield no better results than they did in the original situation in childhood when frustrations were first felt.

Aggression may not always be directed towards the environment by old people but is sometimes directed against themselves They become ill with symptoms of dizziness, excessive fatigue, weakness, and stomach ailments. Malingering in infirmaries is common, since there the residents whose basic need is attention are certain of satisfaction through the attention of the nursing staff. Where the medical staff is limited, this type of reaction creates a serious problem.

Elderly residents who present behavior problems appear generally to be those who have little capacity to bear tension. Their resulting expressions of hostility drain them of their normal functioning ability whether in vocational or leisure-time activity. These episodes may vary in time from the brief

Mrs. Laverty received her B.A. degree in Sociology from New York University in 1941 and her M.S. degree in 1943 from Columbia University and the New York School of Social Work. From 1943 to 1945 she did medical casework for the Presbyterian Hospital, New York, and since 1945 she has done geriatric casework and is Director of Social Service, Peabody Home for Aged Women, New York.

period of a temper tantrum to an almost permanent disability in cases where aggression is turned against themselves and is expressed in physical ailments.

One common aggressive reaction of elderly people, not usually recognized as such, is a continuation of childhood sibling hostility. Hostile impulses towards siblings or their counterparts are often continued throughout life. Children's anger, for example, is directed against the threatening person or object, even to the point of physical attack. This reaction is easily seen in play. Children involved in sibling rivalry situations often attempt to multilate or destroy the doll that represents the competitive person. Popular belief has it that older people outgrow these childish reactions, but chronologic age merely serves to deepen the habitual behavior response. In time it becomes a stereotyped reaction that is automatically and unconsciously aroused in similar threatening circumstances, even though the form of expression may have undergone a social change. A child attacks a hated rival with smarting blows, whereas an adult, conditioned to some extent by the dictates of social demands, attacks a rival with stinging words. The motivation in both instances may be identical and stems from the same source.

The smaller the institutional setting, the more apparent are these characteristic responses because of its similarity to a substitute family group, with the staff in the role of parents and the other residents as siblings. The reaction is similar to that of an older child in a family who feels the deprivation of having to share his mother's attention with a new baby. The oldster expresses his hostility to the newcomer in a home for the aged in a variety of ways intended to hurt, negate, or remove him from the family group. At the same time he strives to deflect parental attention from the newcomer to himself, just as he behaved in childhood.

In a home for aged women, on the same day that a new arrival was admitted, six previously admitted residents besieged the caseworker with extremely irate complaints on exceedingly trivial matters. Their demands for attention were unreasonable and difficult to satisfy. They expressed hostility against the new member, at first guardedly, then more openly, with attempts to depreciate her in every way, hoping that she would be removed from the home. To the woman herself they were coldly polite and sarcastic, with a tendency towards ridicule. Their offers of help involved an element of punishment, paramount in which were strong hints of expulsion for nonconformity to imaginary rigid rules and disciplines. The newcomer was accepted by the group only when special attention by the staff ceased after the usual orientation period to the general home routine.

The social histories of these six women indicated that they were all older children in their families. Three still had younger sisters with whom they exchanged periodic visits. It was noted that prior to a visit either at the institution or to the sister's home, a very trifling incident often precipitated a torrent of aggressive behavior far out of proportion to the occasion. If a visit from the younger sibling was an unexpected one, an aggressive episode followed soon after the visit was over. The carry-over of childhood reactions at such times seemed as heavily charged with emotional tension in old age as it must have been during the early part of life.

Therapeutic techniques similar to those in handling children's sibling rivalry situa-

tions frequently help to minimize the threat when new residents are admitted. The old folks should be carefully prepared for new arrivals, with particular attention centered on those who tend to be disturbed at such times. If they are given a specific responsibility for the newcomer by the head of the home, it will help to minimize their feelings of neglect and thus decrease the rising internal tension. Their achievements should be given much approval and commendation at every appropriate opportunity.

Parental separation in early childhood because of travel, illness, divorce, or death, is also a traumatic experience for children. If the pain of separation is not counteracted in early life by understanding and affectionate elders, the pain will remain dormant in the unconscious part of the mind until a similar experience in later life arouses this same anxiety, which, despite the passing of years and generations, seems to undergo comparatively little change. It is not uncommon to find manifestations of aggressive behavior at times when a well-liked member of the administrative staff leaves permanently, goes on vacation, or is ill. Residents who react at such times seem to require more than their usual quota of kindness, consideration, and affection.

In the same way, residents may rebel against stern administrators if their own parents, tutors, or governesses in early life were strict. If they were deprived of affection or attention in childhood, they will seek to gratify that basic need even in extreme old age. Many adults who overeat and who apparently are unable to satisfy their hunger are unaware that the urge for food may be motivated by an emotional need rather than an organic one.

Although these techniques may not solve the problems entirely, since such reactions are deeply imbedded, unresolved emotional conflicts experienced in early life, nevertheless, there may be a lessening of the intensity of aggressiveness on the part of residents and a marked decrease in their hostile expressions towards those around them.

Services for older people have most often been limited to the easing of environmental pressures. Little improvement in behavior will be noted if the basic need is an emotional one and is allowed to go unmet. Supportive therapy can be successfully applied, when working with the aged since no basic character change is contemplated or expected and yet, if used effectively, it is powerful enough to modify undesirable behavior so that the end result is equally satisfactory. If supportive therapy is geared towards rebuilding or sustaining the maximum degree of ego strength of which the individual is capable, his functioning ability may be restored to the point where he is once again a desirable and useful member of the institution. Destructive aggressive forces can thus be deflected into more constructive channels, and at the same time the old folks will be helped towards maintaining happier mental attitudes.

Two opposite types of cases respond best to supportive treatment. One group includes those people with well-developed egos who are suffering from a temporary breakdown because of heavy environmental pressures. The second group comprises those whose egos have been so poorly developed by inadequate early parental training that they are in a chronic state of anxiety or rebellion. With the first group, the intense emotional disturbances are due to external circumstances that are too great for them to surmount without help. Full functioning ability will return soon after the situation is remedied. Unless the external forces are lightened, the ego continues to be weakened until it reaches the breaking point, and the temporary breakdown may well become a permanent one. In the process of ego disintegration, old unresolved conflicts become reactivated and the old person becomes a behavior problem. The individual may even regress into the state of a helpless infant, losing the power to walk, talk, or the use of other basic faculties. The desire in times of

acute stress to seek a more secure dependency position, as in childhood, is a latent human tendency to which a person may unconsciously resort when overwhelmed by circumstances.

The therapeutic goal in these cases is the repairment of the ego and the reestablishment of the previous defense mechanisms that successfully permitted the person to function normally by the direct method of removing the disturbing elements from the environment. It is just as important to understand the environmental pressures that bear down on elderly people, their sense of social reality, and the force of their inner drives as seen in their attitudes and behavior, as it is with a younger and more responsive group of people, since the same dynamic remnants of their pasts are operating in the present. Other points for study are to determine the degree of their tolerance for frustration, the types of situations that precipitate a breakdown, their immediate reaction, the kinds of defenses they used to hold back primitive impulses to permit normal ego functioning, the degree of defensive strength in critical situations, and how their total adaptation to their usual activities is affected in times of acute anxiety.

If the undesirable behavior persists despite environmental changes, the old person may fall within the second group of cases for whom supportive therapy may also be effective. These people are chronically dependent and in constant need of support, affection, encouragement, approval, and reassurance. They have been anxious all their lives in all kinds of situations, critical or trivial. Anxiety is aroused at the slightest provocation. Therapy is unending because these old people can continue with normal activities only as long as they can lean on the support furnished by the therapist. It is particularly important for the institutional staff to understand the emotional needs of these people, since much will depend upon them in the absence of the therapist.

The therapeutic aims for both groups discussed are to strengthen whatever defenses have become characteristic, to give whatever guidance is needed to help them out of their present dilemma, to relieve environmental pressures, to give reassurance and encouragement to those expressing feelings of inferiority, and to relieve anxiety by assuming a role of protectiveness. Although it is important for the therapist to link present behavior with early life experiences for its diagnostic value, no attempt is made to bring its significance to the awareness of the older person, since it is agreed that old age generally counterindicates the application of "insight" therapy in which the goal is primarily focused on effecting basic character changes.

Much of the aggressive behavior which is so distressing to administrators of institutions caring for the aged may be rerouted into constructive and pleasurable activities if the emotional needs of the residents are understood and some degree of gratification made possible. Even though supportive therapy can set only very limited objectives in working with aged clients, the results in terms of better adjustments and greater happiness for the old folks who must spend the rest of their days in an institution can be as dramatic and satisfying as the more ambitious therapeutic goals set for younger age groups.

Summary

Aggressive behavior of residents in homes for the aged presents difficult problems to the administrative staff. The discussion points up the importance of recognizing that these manifestations are not always based on reality, but may be reactivated responses to earlier life experiences. One example of a continuation of childhood hostility is the sibling rivalry situation which becomes reactivated in an old age home whenever a new arrival is admitted since the Home and the staff have become the substitute family group for the residents. Therapeutic tech-

niques similar to those in handling children's sibling rivalry problems can be used effectively.

Other forms of aggressive behavior commonly displayed by elderly people, whether directed towards the environment or towards themselves through illness, respond well to supportive therapy geared to rebuilding or sustaining ego strength to the point where they can again continue normal ego functioning. Two opposite types of cases with which supportive therapy is particularly effective are those with well developed egos who are suffering from a temporary ego weakening because of severe environmental pressure and the chronically anxious, dependent group with poorly developed egos.

Ways are suggested for diverting aggressive energy into constructive channels that are gratifying for the old people and at the same time helpful to the institutional staff.

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The author's address is:

MRS. RUTH LAVERTY

THE PEABODY HOME

1000 PELHAM PARKWAY

BRONX, NEW YORK 61, NEW YORK

CURRENT COMMENT

Hospitals For the Mentally Ill

Next to the lack of trained personnel it is the senile patient who presents the greatest problem in the country's mental institutions today. Almost one out of every three patients admitted to a mental hospital comes under the classification of physical and mental deterioration due to old age.

For the most part these elderly patients are incurable and have been sent to the hospital to die, either by the courts or by relatives who do not want to or have no way to care for them.

Although there will be more and more senile patients as our population grows older, constructing additional buildings and providing extra beds is not the solution to the problems confronting the mental hospitals. It costs at least $10,000 per bed to build more buildings, and each mentally ill patient who is hospitalized and not cured is costing the state $10,000 just to provide space. Rather the answer lies in providing a more suitable method of caring for the senile patients and freeing the existing facilities for the purpose for which they were designed.

Age and the Effects of Smog

Dr. Clarence A. Mills, head of the Department of Experimental Medicine at the University of Cincinnati, reports that up to 77 per cent of persons older than 50 years were affected by the poisonous smog which settled over Donora, Pennsylvania, last October. Only 55 per cent of persons under 50 years of age were affected.

In Britain

The Joseph Rowntree Village Trust, the Cocoa Works, York, England, has undertaken an inquiry in the City of York involving personal visits to some eleven thousand elderly residents. The results are now being tabulated, and a report will be issued within a few months.

The Trust has also helped to provide a number of clubs, particularly for elderly men, which are open during the entire day and are run by a committee of the members themselves. In addition the York Community Council and the Women's Voluntary Services operate a series of weekly clubs for elderly men and women. The Women's Voluntary Services have also started a meals service for elderly infirm people which makes use of the York Municipal Restaurant as a source of supply.

York possesses a number of charities, many of which date from medieval times and which are at present used almost entirely for old people. Their terms of trust, however, limit their use to types of help which were appropriate many years ago but which are now very largely wasted. The Village Trust, therefore, seeks to promote a scheme in Parliament whereby a substantial number of these charities can be pooled and the scope of their work extended and refocused.

The executive of the Joseph Rowntree village Trust, Lewis E. Warnilove, is interested in learning about American community developments and projects in improving services to the aged.

Birds and Fishes in the News

An aged parrot named Robert made the headlines in London newspapers in February. The bird, reported to be 125 years old, had just laid its first egg and had its named changed from Robert to Roberta.

A tooth unearthed recently at a limeworks in New Zealand has been identified as that of a shark of a species which lived about 50,000,000 years ago.

Elders in the News

Centenarians.—Luis Enriquez of San Antonio, Texas, who claims to be 128 years old, was found to have perfect blood pressure and still has all but three of his teeth. He was born in San Diego, Texas, and spent most of his active life as a cowboy.

A case worker reported that Edward Harris of Decatur, Illinois, who was 111 years old in March, is planning a trip to Kentucky.

Mrs. Minnie D. Johnson of St. Louis celebrated her 104th birthday in March.

J. P. Wooten, a retired farmer in Louisiana, Missouri, celebrated his 100th birthday March 15.

Daughter of an early French settler in Washington County, Missouri, Mrs. Margaret Bourbon celebrated her 100th birthday in March. She quilts, sews, and reads, usually without eyeglasses.

Also celebrating her 100th birthday this year is Mrs. Retta Conroy. Her chief hobby is making hundreds of doll quilts which are given to underprivileged children.

* * *

Action—90-year-old Charlie Weiche of Wheatland, Oklahoma, who fell 20 feet to the bottom of a well and clung to a pipe an hour and twenty minutes to keep from drowning, felt good enough after his experience to joke about it.

Mental activity is shown by Mrs. Ida Hoyt Bunday of Sabula, Pennsylvania, who celebrated her eighty-third birthday by reeling off, the names and birthdates of her grandchildren—of whom she has 62. She also has 41 great-grandchildren but she has difficulty keeping track of them.

James B. Connolly, 80 years old, who says he never has seen a comic book, is Boston's new comic book censor. He is the author of numerous sea stories and is America's first Olympic champion of modern times.

Charles E. Benschoter, 74, of Los Angeles, was ordered by a hold-up man to face the wall. Instead, he knocked the robber down, snatched a beer bottle and pounded him with it until he fled.

Mr. and Mrs. Christoph Schulz, both 73-years-old, are embarking for the third time in their careers in the big game trapping business in Africa.

"Life begins at 50," says Mrs. Rose Lavin of Chicago. Mrs. Lavin, who has two grandchildren, has so far this year become a composer, model, and G.O.P Club Officer—all the result of a New Year's resolution to achieve several ambitions in 1949.

* * *

Romance—Mr. and Mrs. T. D. Cutsinger, Humphreys, Missouri, celebrated their 78th wedding anniversary February 9. The span of their marriage tops by one year that of Mr. and Mrs. Sam Mercer of Sioux Falls, South Dakota, who marked their 77th wedding anniversary January 27. Both men are 95 years old; both women are 94.

Mr. and Mrs. Charles A. Van Cleave of Overland, Missouri, observed their 70th wedding anniversary February 12. Although Van Cleave is 89 years old and his wife is 88, they live alone and do all their own work.

James Ten Eyck, 78 years old, told a newspaper and radio station in Freeport, Illinois, that he wanted to advertise for a

wife. Neither would accept his advertisement, but as a result of their news stories Ten Eyck and Mrs. Martha Kochsmeier have applied for a marriage license.

Dr. Andrew Lawson, 87, eminent geologist of the University of California, and his wife Isabel, 39, became the parents of a son—their first—in March.

The sixth child, a son, was born to Mr. and Mrs. Fred J. Turley, Helena, Arkansas. Turley is 65 years old; his wife is 60.

News and Notes

A workshop for research workers and teachers interested in problems of adjustment in old age will be held at the University of Chicago from August 8 to 27. Professors Ernest W. Burgess, Chairman of the Department of Sociology, and Robert J. Havighurst, Committee on Human Development, will be in charge of the workshop.

* * *

The University of Chicago will also be host to an Institute on the Study of Old Age from August 8 to 12. The program will consist of lectures and discussions on practical problems in the field of old age.

* * *

At the Institute on Adjustment of the Aging Population at the University of California in February, Ewan Clague, United States Commissioner of Labor Statistics, predicted that persons over 50 years old soon will become a powerful political block.

* * *

In February 75 persons with incurable diseases organized their own club in Akron Ohio. Most of them are suffering from multiple sclerosis or muscular dystrophy and went to their first meeting in wheel chairs, on stretchers, and on crutches.

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The Missouri League of Nursing Education and the University of Missouri sponsored a two day institute in St. Louis in February to discuss problems involved in the care of aged persons.

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The Conference on the Aged of the Social Planning Council met in March in St. Louis. Medical and social aspects were considered.

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The Greater New York Safety Council presented various speakers at their Home Safety Sessions March 31. Dr. F. D. Zeman spoke on growing old safely.

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The Third Annual Hobby Show for Older Persons sponsored by the Welfare Council of New York City was held in New York May 11 through May 22 at the American Museum of Natural History Educational Hall. Any person 60 years old or over who has a hobby or interest which could easily be displayed was eligible to participate.

* * *

On July 20 and 21, the University of Michigan will hold its second Summer Session Institute on Adult Aging at Ann Arbor. The program will be directed toward three broad topics: Creative Leisure Time Activities, Housing and Living Arrangements, and Employment and Employability. There will be three principal addresses on various phases of each subject, a demonstration of recreational activities, and organized discussion groups.

The Institute will be addressed to professional persons including labor leaders and industrial personnel workers and to interested lay people. The speakers who have been invited have had outstanding experience in the aspects of the field they are being asked to discuss.

Persons wishing a copy of the program or of the proceedings of the 1948 Institute, *Living Through the Older Years,* are invited to write to the Director, University of Michigan Extension Service, Ann Arbor.

THOMAS PARR
"The Old, Old, Very Old Man"

THE myth of Thomas Parr, (1483?-1635) the best known of the supercentenarians, has been exhaustively and critically examined by William J. Thoms in his classical work, *The Longevity of Man, Its Facts and Fictions,* published in 1873. In this book the distinguished founder of *Notes and Queries* analysed for the first time the evidence for the alleged longevity of Parr, Jenkins, and other reputed centenarians by the same methods used in other forms of historical inquiry. He outlined the procedures for obtaining evidence and stated the principles whereby its validity might be judged.

However erroneous we may today consider Parr's claims to long life, his lasting place in medical history is assured by the fact that the postmortem examination was made and described by William Harvey, discoverer of the circulation of the blood. This "Anatomical Examination of the Body of Thomas Parr, aged 152 Years" was performed on November 16, 1635, but not published until 1669, twelve years after Harvey's death, when it appeared in the work of Dr. Betts entitled *De Ortu et Natura Sanguinis,* the manuscript having been presented to Betts by Michael Harvey, nephew of the great physician. As Thoms pointed out, Harvey accepted the popular belief in Parr's advanced age.

The following quotation from the protocol illustrates the medical reasoning of that day and at the same time discloses a vivid picture of the filth and smells of the London to which Parr was brought to be exhibited to King Charles I and where he died. He was buried in Westminster Abbey.

"The cause of death seemed fairly referrible to a sudden change in the non-naturals, the chief mischief being connected with the change of air, which through the whole course of life had been inhaled of perfect purity,—light, cool, and mobile, whereby the praecordia and lungs were more freely ventilated and cooled; but in this great advantage, in this grand cherisher of life this city is especially destitute; a city whose grand characteristic is an immense concourse of men and animals, and where ditches abound, and filth and offal lie scattered about, to say nothing of the smoke engendered by the general use of sulphureous coal as fuel, whereby the air is at all times rendered heavy, but much more so in the autumn than at any other season. Such an atmosphere could not have been found otherwise than insalubrious to one coming from the open, sunny, and healthy region of Salop; it must have been especially so to one already aged and infirm.

"And then for one hitherto used to live on food unvaried in kind, and very simple in its nature, to be set at a table loaded with variety of viands, and tempted not only to eat more than wont, but to partake of strong drink, it must needs fall out that the functions of all the natural organs would become deranged. Whence the stomach at length failing, and the excretions long retained, the work of concoction proceeding languidly, the liver getting loaded, the blood stagnating in the veins, the spirits frozen, the heart, the source of life, oppressed, the lungs infarcted, and made impervious to the ambient air, the general habit rendered more compact, so that it could no longer exhale or perspire—no wonder that the soul, little content with such a prison, took its flight."

F.D.Z.

The Olde, Old, very Olde Man or Thomas Parr, the
Sonne of Iohn Parr of Winnington in the Parish of Alberbury
In the County of Shropshire who was Borne in 1483 in
The Raigne of King Edward the 4th and is now living in
The Strand, being aged 152 yeares and odd Monthes 1635
Hee lyed November the 15th And is now buryed in Westminster

THO: PARR OF Y^E COUNTY OF SALLOP. BORNE IN A^D: 1483. HE LIVED IN Y^E REIGNES OF TEN PRINCES VIZ: K. EDW. 4. K. ED. 5. K. RICH. 3. K. HEN. 7. K. HEN. 8. K. EDW. 6. Q. MA. Q. ELIZ. K. JA. & K. CHARLES. AGED 152 YEARES. & WAS BURYED HERE NOVEMB. 15. 1635.

ORGANIZATION section

CLIVE M. MCCAY, *President*
Cornell University
Ithaca, New York

HENRY S. SIMMS, *Secretary*
630 W. 168th St.
New York 32, New York

ROBERT A. MOORE, *Treasurer*
570 S. Euclid Ave.
St. Louis 10, Missouri

C. J. VAN SLYKE, *President-Elect*
National Institutes of Health
Bethesda 14, Maryland

Gerontologic Activities in France in 1948

FRANÇOIS BOURLIÈRE

A conference for the Scientific Study of Aging of the French Population, organized by the National Institute of Demographic Studies and the National Statistical Institute, took place in Paris April 22 through April 24, 1948.

The main purpose of the meeting was to call governmental attention to the increasing national senescence and its social and economic implications, and most reports were consequently devoted to demographic and economic problems.

V. Fonsagrive, discussing the evolution of the age structure of the French population from 1775 to 1948, pointed out the striking differences which have occurred during approximately a century and a half. Since 1851 the demographic data have been quite satisfactory and permit a close study of the change in birth rate, mortality rate, and expectation of life at various ages. This report was completed in a paper by P. Depoid on the prospects of the future age composition of the French population.

A survey of the age structure of the population in different countries and in different regions of France by P. Gasc and V. Fonsagrive gave comparative tabular data on the population structure in 1940 of young and old countries. The different nations were divided into three categories: the "young" countries where people of 60 and over do not exceed 4 to 10 per cent of the population (Brazil, Japan, India, and U.S.S.R.), the "relatively old" countries where people of 60 and over average 10 to 11 per cent (U.S.A., Canada, Italy, and Spain), and the "senescent countries" where people of 60 and over represent 12 to 15 per cent of the population (Great Britain, France, Germany, and the Scandinavian countries).

France, with 15.9 per cent of people 60 and over, has the highest percentage. A thorough analysis of the comparative senility of various parts of the country showed that in some parts of France (Ariège, Lot, Creuse, Yonne, Nièvre, Gers, Tarn-et-

Garonne) the proportion of people of 60 and over may reach 22.5 per cent. The respective share of such factors as birth rate, mortality rate, and migratory movements was discussed. A paper by Jean Daric on the evolution of the age composition of the French working class completes this picture of the French population structure.

A survey of the economic consequences of this national aging was made in a series of reports by G. Létinier, F. Boverat, R. Froment, J. Laureau, and others. Many statistical data pointed out the burden on the French budget and national health insurance (Sécurité Sociale) caused by the increasing number of aged as well as the influence of the aging population on national productivity. A study of the psycho-social behavior and political attitudes as a function of age based on sample opinion polls was made by A. Girard.

In such a situation what must be done if the age structure is to be stabilized and the rate of aging of the population of France to be reduced? V. Fonsagrive, J. Bourgeois-Pichat, L. Henry, and M. Moine stated that the birth rate must be increased up to three children per married couple between 1950 and 1960 and that a strong effort must be made to reduce infant mortality and mortality due to tuberculosis. A carefully selected immigration of healthy young men and women was likewise recommended.

Problems of individual aging were approached in a series of reports dealing with the present knowledge of biologic and medical aspects of the problem of senescence. A comprehensive fifty page review of the recent Anglo-American, German, and Italian literature on the morphology, physiology, genetics, and ecology of aging with a selected bibliography of more than 250 titles was given by F. Bourlière, and special emphasis was placed on the results of recent investigations on aging of the rat and of healthy senile human individuals. The asynchronism of functional involution and the constancy of the internal medium were also pointed out. The evidence of the relation between growth and senescence was based on growth retardation experiments and data from comparative physiology.

The problem of the aging of abilities throughout the life span was approached by Madame S. Pacaud. Utilizing the extensive data gathered in the psychotechnical laboratory of the French National Railways, she confirmed the conclusions of Miles and others and insisted on the asynchronism of involution of various abilities. Striking differences in mental decay were noted between gifted individuals and those less able. This report was completed by a paper by J. Dublineau on the psychologic aspects of senility from the psychiatric point of view, and a short review of the various attempts to produce rejuvenescence was made by C. Laroche.

The conference unanimously adopted the conclusions of the report by V. Korenchevsky on the desirability of establishing an international organization for gerontologic research.

Detailed reports of these Trois Journées pour l'Étude Scientifique du Vieillissement de la Population have been published in the form of a book in five parts by L'Alliance Nationale contre la Depopulation (217, Rue du Faubourg Saint Honoré, Paris, 50 francs each part).

* * *

On April 26, 1948, the French Gerontological Society held its annual meeting at the School of Medicine of the University of Paris, with L. Binet, the Dean of the Medical School, presiding.

Papers were given by V. Korenchevsky, who had been invited by the Society to give a lecture on his gerontologic research at Oxford, and by L. Binet, M. Baclesse, and F. Bourlière. In his report, Dr. Korenchevsky summarized that part of his research work which has been published in the JOURNAL OF GERONTOLOGY (1946 to 1948) and in the British Medical Journal (1948).

Professor Binet, welcoming Dr. Korenchevsky, emphasized his contribution to gerontology not only by his research work, but also by his leadership in the organization of research on aging in various countries.

L. Binet, M. Bochet, and F. Bourlière reported the preliminary results of their investigation on the effects of implantation of testosterone pellets in old men. In most cases testosterone, in doses between 600 and 800 mg., produced an improvement in the general state of health of the treated patients and increased their basal metabolic rate and muscular strength. These effects disappeared some time after complete resorption of the pellets.

The scientific part of the meeting was closed by a comprehensive review by Dr. Baclesse on the endocrinologic factors in the processes of aging. She concluded that although there are a great number of papers referring to this problem our knowledge on the subject is often contradictory and touches only superficially, if at all, some important fields of the morphology, physiology, and pathology of old age.

At the administrative part of the meeting a new Executive Committee was elected:

A. Baudouin, Secretary of the National Academy of Medicine, Chairman,

L. Binet, Dean of the Paris Medical School, Vice-chairman,

R. Courrier, Permanent Secretary of the National Academy of Sciences, Vice-chairman,

M. Baclesse, Honorary Secretary (biologic),

F. Bourlière, Honorary Secretary (medical).

* * *

On June 19 and 20 the Vittel Medical Society organized, under the chairmanship of Professor Joannon, a conference on longevity and geriatrics intended for general medical circles and in particular for general practitioners.

Among various reports were those of L. Binet on the diagnostic and prognostic importance of the study of the basal metabolic rate of elderly men and of Professors Huguenin, Le Grand, Meriel, and Lebon on geriatric prophylaxy, early detection and treatment of benign and malignant hyperplasias, cardio-vascular and urinary diseases, and nutritional disorders. Other subjects, such as longevity in connection with race and sex (M. Delaporte), mental health (P. Le Grand), and the hygiene of old age (P. Delore), were also discussed.

* * *

CORRECTION

The minutes of the Fourth Annual Meeting of the Council of Gerontological Society, Inc. should be changed to read:

"Upon motion duly made, seconded, and carried, it was voted that the subscription price of the JOURNAL be raised to $8.00 per year ($8.50 for subscriptions outside the Western Hemisphere) and that the membership dues remain at $10.00 (including a subscription to the JOURNAL) for members in the Western Hemisphere, $10.50 for members in the Eastern Hemisphere."

Minutes of the 1949 Annual Business Meeting of Gerontological Society, Inc. should be changed to read:

"The Chairman announced that the subscription price of the JOURNAL will be raised to $8.00 per year ($8.50 for subscriptions outside the Western Hemisphere) but that the membership dues (including a subscription to the JOURNAL) will remain at $10.00 for members in the Western Hemisphere and $10.50 for members in the Eastern Hemisphere."

HENRY S. SIMMS, *Secretary*

SECOND ANNUAL SCIENTIFIC MEETING OF THE GERONTOLOGICAL SOCIETY, INC.

The Second Annual Scientific Meeting of the Gerontological Society, Inc. will be held November 5 and 6, 1949, at the Knickerbocker Hotel, Chicago, Illinois. Dr. William B. Kountz, Program Chairman, requests that all members who wish to present papers (who have not already indicated their desire to do so) send their titles and abstracts to him immediately at 5600 Arsenal St., St. Louis 9, Missouri.

PHYSICAL MEDICINE IN GERONTOLOGY

The literature on application of physical agents to the treatment of the aged is not extensive. Among more recent references is a review by Erickson Medical Clinics of North America, *27:* 1007-1018, 1943) and one by Krusen and Leden (Geriatrics, *1:* 409-419, 1946).

The first of the objectives in the physical treatment of the elderly lies in the field of preventive medicine. It is generally agreed that keeping old people in bed often leads to cardio-pulmonary or renal decompensation. In a wider sense muscle and joint function must be guarded by insistence on a certain minimum of use. Thus ankylosis of the phalangeal joints from immobilization by splints occurs at an early stage in many individuals after the age of 50. Intellectual and emotional functions also wither among the bedfast.

A second frequent objective is the control of pain. This must be managed by the judicious use of analgesics and physical measures, with regard for the dangers of addiction in pain of long standing. Heat is the most useful agent, whereas treatment with cold applications is rarely as effective. Massage is likely to help when pain is accompanied by tenderness to digital pressure. The counter-irritant effects produced by actinic radiation may be needed, as well as trans-dermal electrophoresis of drugs such as histamine and acetyl-beta-methylcholine, measures which are much less frequently used than luminous heat and diathermy. Hydrotherapy, especially as whirlpool baths, may skillfully combine a number of effects, including hydromassage. Occupational therapy may distract the sufferer sufficiently to permit lower doses of drugs. Other aspects of pain control are mentioned by Papper and Rovenstine (Geriatrics, *1:* 420-426, 1946). It possibly has been overemphasized that the elderly patient tolerates less of both drugs and physical agents than the youthful patient.

Geriatric Rehabilitation

Britain appears to be well in advance in this field, judging from numerous recent articles by Affleck (Occupational Therapy & Rehabilitation, *27:* 1-11, 1948) Howell (British Journal of Physical Medicine, *11:* 40-42, 161, 1948), Stoddard (British Journal of Physical Medicine, *11:* 10-13, 1948), Cosin (British Journal of Physical Medicine, *11:* 161, 1948), and Warren (British Journal of Physical Medicine, *11:* 167-169, 1948). Cosin and Warren have accomplished interesting results with a class of patients heretofore usually regarded with apathy. In this country a few universities have established centers for gerontologic research and interest is increasing.

Jokl (British Journal of Physical Medicine, *11:* 2-7, 1948) has stated a principle of great importance for therapeutic exercise, particularly in geriatrics, that individuals with pathologic conditions can benefit from exercise as well as normal individuals. He gives as examples several outstanding athletes with cardiovascular disease and poliomyelitis defects.

Cosin (British Journal of Physical Medicine, *11:* 161, 1948) cites instances in which treatment resolutely carried out in spite of the obvious existence of proved advanced malignant disease and other equally serious defects has brightened the last months or years of the patient and made him considerably better off. Quite often multiple diseases are present, but even this fact need not dismay the physician, according to Warren (British Journal of Physical Medicine, *11:* 167-169, 1948). In suitable institutions exercise classes in both physical and occupational therapy may result in appreciable benefits.

Rehabilitation may be defined in such a way that complete restitution to health and vocation may be the normal objective in one instance, complete self-care without economic independence in another, and a change from bedfastness to a wheelchair existence in a third. Rusk (Westchester Medical Bulletin, *15:* 1947) has cited a remarkable example of a campaign in a Minneapolis veterans hospital to mobilize 130 neurologic patients, mostly World War I veterans, many of whom had not been out of bed in ten years. Of the group of 130, 25 have returned home and to work, 40 are home and capable of light work, 30 are ambulatory and undergoing further treatment, 25 are able to care for themselves, and only 10 are counted as failures.

Physical Procedures in Certain Common Conditions in the Aged

Degenerative joint disease.—The best recent discussions on this subject are those of Savage (British Journal of Physical Medicine, *11:* 43-47, 1948) and Burt (British Journal of Physical Medicine, *11:* 173-177, 1948). The cause of pain is apparently referable to ligamentous disorganization and resulting tension on the synovial membrane rather than cartilaginous erosion or bony spurs. Important measures include heat (radiant, diathermy, paraffin baths, whirlpool), massage (especially in fibrositis), and exercises. Manipulation under anesthesia may be required to relieve stiffness from fibrosis or muscle contracture. It is especially disastrous for the knee joint to continue weight-bearing in the presence of a flexion contracture amounting to 15° or more, and surgical correction may be required.

The commonest sites of degenerative joint disease are the spine, hips, and knees. Heberden's nodes rarely require treatment. The back is exceedingly difficult to evaluate because many patients have advanced roentgenographic findings without any symptoms at all. Involvement of one or both hips can be most painful and disabling, and vitallium mold arthroplasty or obturator neurectomy may be indicated in selected cases.

Menopausal arthritis is defined by Raff (South African Medical Journal, *21:* 294-298, 1948) and somewhat more convincingly (on the basis of pathologic findings) by Dallemagne and Ory (Acta Physiotherapica et Rheumatologica Belgica, *3:* 53-62, 1948). An entirely different disorder is the postmenopausal osteoporosis of Albright and Reifenstein (The Parathyroid Glands and Metabolic Bone Disease, Williams & Wilkins, Baltimore, 1948), characterized by muscle and bone atrophy, pain in the back (often with fractures), and "fish-vertebrae" produced by herniation of intervertebral disks into the softened bodies of the vertebrae. Androgens and exercises may be needed for the weakened muscles in addition to estrogen replacement.

In a sketchily written paper on rheumatism in the aged, Ishmael (Geriatrics, *3:*

217-230, 1948) discusses shoulder-hand syndrome as an end result of multiple possible causes. The treatment consists of rest in the acute stage, aided by heat and analgesics. A sling may be used for splinting when absolutely necessary to control pain and spasm, but prolongation of its use will result in impaired function. Contrast and whirlpool baths and passive vascular exercise are advised for the reflex dystrophy; mobilization of the shoulder joint is then brought about by therapeutic exercise.

Frozen shoulder may not be combined with limited motion of the elbow, wrist, or hand, but such combinations are increasingly frequent the older the patient. The syndrome is especially common on the left side following coronary thrombosis and in the affected extremity after hemiplegia. Some authorities assert that its usual origin is supraspinatus or biceps tendinitis, a degenerative change rather than an inflammatory one, with secondary involvement of the subacromial bursa. The end result includes atrophy of the shoulder abductors, contracture of the muscles in the anterior and posterior axillary folds, and tender points in the anterior deltoid and at the deltoid insertion (Moseley, Shoulder Lesions, Charles C. Thomas, Springfield, 1947).

Pathogenesis and treatment are also reviewed by Burt (British Journal of Physical Medicine, *11:* 173-177, 1948) who in addition discusses the dropped shoulder-girdle syndrome, the symptom of which is acroparesthesia of the upper extremities. The condition was noted in middle-aged women who under wartime conditions in England were often obliged to carry heavy baskets and bundles. Symptoms are referable to sagging of the shoulders, so that pressure is produced on the brachial plexus. Treatment requires exercises to strengthen the shoulder elevators (upper trapezius and levator scapulae). Burt also discusses prolapse of the cervical intervertebral disk. Narrowing of the disk in the roentgenogram is almost invariably accompanied by projecting or bridging spurs about the margins of the vertebrae and loss of the cervical lordosis. Pains and paresthesias radiate into the shoulders and arms, and head motions are limited and painful. Treatment includes traction in a Sayre sling, in addition to diathermy and kneading massage. Daily treatments for a few weeks may induce prolonged remissions of symptoms (Mead, Postgraduate Medical Journal, in press).

Rheumatoid arthritis.—This disorder is found not infrequently in the elderly, and opinion is divided as to whether it is a severer disease in the old than in the young (Short and Bauer, New England Journal of Medicine, *238:* 142-148, 1948). In general the methods of treatment mentioned under degenerative joint disease are applicable. During exacerbations complete bed rest and splints for exudative painful joints may be necessary in spite of the unfortunate results of immobilization. Treatment is often a compromise of desirable and undesirable effects. The patient must be led to understand the nature and probable course of his disease. Aldred-Brown (A Survey of Chronic Rheumatic Diseases, pp. 257-264, Oxford University Press, London, 1938) discusses the benefits of hydrotherapy, while Krusen and Leden (Geriatrics, *1:* 409-419, 1946) emphasize massage. Paraffin baths are very effective because of the higher temperatures tolerated and the resultant prolonged hyperemia. The hands and feet may be immersed directly; for other joints the material may be painted onto the skin in several layers.

Rheumatoid arthritis may last from twenty years to a lifetime, and the result is likely to be unsatisfactory if the patient is treated intensively during acute exacerbations and then neglected during periods of relative quiescence. Shoulder and wrist fixation, ulnar deviation, disabling subluxations, and flexion deformities of the knees may occur in the unsupervised patient.

It is the practice in the Arthritis Clinic and Department of Physical Medicine at

Washington University Clinic to arrange a program of exercises and other treatments that can be carried out largely in the home, with periodic visits for a check on progress of the disease and details of treatment. In this way the patient can carry on with intelligent treatment for many years at moderate cost. Corrective splints of Celastic are manufactured as needed for night use to prevent the development of severer deformities.

Hemiplegia—The commonest neurologic disorder of old age is hemiplegia resulting from cerebral thrombosis and (much less often) cerebral hemorrhage. This much neglected disorder is actually one of the most gratifying to treat (Rusk, J.A.M.A., *39:* 14-16, 1949). The common practice of lumping all hemiplegic patients into one category labeled cerebro-vascular accident and then looking quickly for the nearest home for custodial care of incurables cannot be too heartily condemned.

The first decision to be made is whether the process is embolic or locally occlusive. Progressive arterial disease is not necessarily present in the former case, and the patient may have many years of useful life and work ahead. Next the most accurate possible structural localization of the softening must be made, using the guides established by Neilsen (A Textbook of Clinical Neurology, Hoeber, New York, 1946). For example, it may not be understood why the patient fails to comprehend directions and to progress until it is discovered that his arterial lesion may have produced an auditory aphasia.

Treatment begins the first day of the illness. Carefully performed passive motions prevent contractures such as frozen shoulder and reestablish proprioceptive patterns. Faradic or sinusoidal stimulation may help illustrate the movements and add some strengthening effect, but in severe spasticity it is probably contraindicated. Heat from warm baths or lamps may induce relaxation.

Parkinsonism and multiple sclerosis.—In some instances, just as in far advanced crippling rheumatoid arthritis, no useful purpose is served by physical treatment. Progressive resistance exercises have been successfully used in combating muscle atrophy and acute spinal flexion. Occasionally, as in hemiplegia, a short-leg brace will prevent toe-drop and circumduction gait. Frenkel's exercises may be tried in posterior column ataxia (tabes, combined system disease, multiple sclerosis), but they are much less likely to help in cerebellar ataxia.

For further details on the treatment of neurologic conditions the chapter by Watkins (Physical Medicine in General Practice, pp. 144-173, 341, Lippincott, Philadelphia, 1946) should be consulted.

Senile gait disorders.—Critchley (Geriatrics, *3:* 364-370, 1948) has well discussed these conditions, pointing out that they are a diagnostic complex of many possible causes at several levels of the neuraxis. One variety involves no paralysis whatever but constitutes a kind of apraxia which gives rise to the Petrén, or trepidation gait. Also based on arteriosclerosis is senile cerebral diplegia. Next are lacunar and postero-lateral affections of the spinal cord, some of which are associated with a macrocytic anemia. Peripheral neuritis is rare except in diabetes mellitus, where it may be combined with myelopathies. Finally there is the senile myopathy of Lhermitte, a somewhat doubtful entity which in the light of recent endocrinologic discoveries may represent withdrawl of the anabolic 17-ketosteroid hormones of the suprarenal cortex and testis rather than an inflammatory process.

Treatment of the senile paraplegias may be exceedingly difficult. When combined with severe memory defects, disorientation and sphincteric disturbances, or the presenile dementias of Alzheimer and Pick, these are hopeless situations.

Heart disease—. The best available article on this subject is that of Bishop (Geriatrics, *3:* 371-378, 1948). Following an enforced rest in bed because of a myocardial infarction or congestive failure from any cause, the patient should begin convalescent exercises while still in bed. At first these should consist only of massage, passive motions, and breathing exercises, but later the Schott resistance exercises which increase muscle strength and endurance should precede walking. Later still the Oertel system of graded walks may be used, with rest at convenient intervals. None of these exercises should be rigorous enough to produce anginal pain. To avoid boredom, exercise should if possible be combined with occupational therapy.

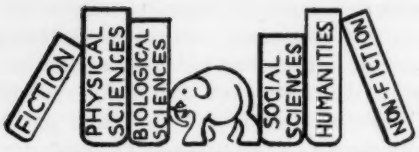
Odel (Geriatrics, *2:* 197-204, 1947) concurs in general with the ideas of Bishop. Kuh (Yale Journal of Biology and Medicine, *19:* 697-705, 1946-1947) presents a plan of work recommendations for chronic cardiac patients grouped in four classes according to the functional convention adopted by the American Heart Association. No work restrictions are placed on Class I except jobs where sudden collapse might endanger others. Class II are allowed 50 per cent of normal activity, Class III 25 cent, Class IV sedentary work, and Class V no work. Of 84 patients with coronary thrombosis assigned work by these standards 56 returned to work. Thirty had been working more than a year, 19 of these on the same jobs, 11 on lighter work. Of this 19, 15 were doing manual labor.

Occlusive arterial disease of the extremities.—The conservative treatment of these conditions is reviewed in a recent comprehensive article by Samuels (Geriatrics, *3:* 273-284, 1948) who recommends the use of vasodilators, careful surgical dressing, and nonintervention where gangrene is already established. He believes that a line of demarcation and spontaneous amputation should be permitted exactly as in the treatment of frostbite. For less severe, non-gangrenous disease he suggests postural exercises and diathermy, but advises against the use of cradles and passive vascular exercisers. Diathermy as commonly applied to the affected extremity is dangerous but it may be used with safety when applied to the pelvic region to produce vasodilation in the limbs (Mead, J.A.M.A., in press). On the other hand a cradle or baker in which an air temperature of 35 C (95 F) or less is maintained is recommended by many authorities.

Space does not permit a full discussion of this important subject. For functional tests and basic physiology the monograph by Richards (Peripheral Circulation in Health and Disease, Williams & Wilkins, Baltimore, 1946) should be consulted. The publications on treatment by Allen, Barker, and Hines (Peripheral Vascular Disease, Saunders, Philadelphia, 1946), Kramer (Peripheral Vascular Diseases, Davis, Philadelphia, 1948), and Wright (Vascular Disease in Clinical Practice, Yearbook Publishers, Chicago, 1948) are also useful.

Traumatic affections of the extremities.—Hip nailing in elderly individuals who fracture the neck of the femur in a fall has considerably altered the death rate for these accidents. These patients can be made to walk again in a few hours or at most a few days. Subsequent treatment consists of strengthening exercises for the thigh and abdominal muscles and instruction in walking. Colles fractures are next in frequency. Casts permitting finger exercises are essential as well as early referral for hydrotherapy, massage, active exercise, and occupational therapy. The theory and treatment of posttraumatic stiffenings are well considered by Devillers (Acta Physiotherapica et Rheumatologica Belgica, *3:* 63-81, 1948). The same principles are followed in burns, sprains, and tendon and nerve repair.

SEDGWICK MEAD
Division of Physical Medicine
Washington University School of Medicine
St. Louis, Missouri



BOOKS

GUIDE TO LONGEVITY

HOW TO LIVE LONGER, Justus J. Schifferes, E. P. Dutton & Co., Inc., New York, 1949, $3.00, 255 pages.

There are three purposes of this book, namely (1) to inform the public as to the high death rate from the most prevalent diseases, (2) to discuss the nature of these diseases, and (3) to tell how to avoid premature death from these same causes.

It is highly desirable that the public should be awakened to the fact that diseases of the heart, arteries, and kidneys kill the majority of adults and cause 46 per cent of the deaths of all ages—or 3.5 times the death toll from cancer. The facts presented in the first two chapters should be of interest to all adults.

Subsequent chapters discuss the following causes of death, with advice to sufferers in each category: cardiovascular-renal diseases, cancer, accidents, pneumonia, tuberculosis, diabetes, syphilis, suicide, and infant deaths. Arteriosclerosis, which is involved in a large portion of the cardiovascular-renal deaths, deserves more space and should not be confused with hypertension. The severity of arteriosclerosis in diabetes should be mentioned.

The author made a conscientious attempt to give advice for avoiding premature death from each of the major causes of death. This advice of necessity boils down to two admonitions: (1) live moderately, and (2) see your doctor.

Although the scientific ignorance concerning cardiovascular-renal diseases is mentioned, the book does not deal with the need for research. It might have been explained that the high death rate from adult diseases is the result of lack of enough research to give physicians an adequate working knowledge concerning these diseases.

The books is intended for nonmedical readers. The medical reader will be irritated by the corruption of cardiovascular-renal to one word, as well as by such comments as "Cardiovascularenal (sic), the most dangerous word in the language," and "Coma is an acid poisoning of the system . . ." The author says of cardiovascular diseases: "Stay out of the way of the killer, or learn how to disarm him." He does not explain how.

HENRY S. SIMMS

ILLINOIS REPORT ON CARE OF THE CHRONICALLY ILL

SECOND INTERIM REPORT CONCERNING THE CARE OF THE CHRONICALLY ILL IN ILLINOIS, The Commission on the Care of Chronically Ill Persons, Springfield, 1947, 279 pages, paper bound.

This report reviews the activities and findings of the Illinois Commission over the period of two years since its creation in 1945 by the General Assembly to carry on in a broader field the studies of the Committee to Investigate Chronic Diseases

among Indigents. Originally estimated at 90,000 chronic invalids in the state, the number of persons so handicapped by chronic disease that they require care by others now appears to be closer to 117,000, exclusive of the tuberculous and mentally ill patients. A minimum of 35,000 need care outside their homes. A deficiency of over 23,000 institutional beds is estimated to exist for this group of patients.

The problem, according to the Commission, must be met by an attack along the following lines:

(1) "Provision of decent and adequate facilities for the care, treatment and possible rehabilitation of those now affected with chronic disease; and
(2) a concerted and co-ordinated program for research into the causes of chronic illness in order that the incidence of chronic disease may be reduced or eliminated and methods of treatment improved."

Architects' drawings, cost estimates, and operational plans for a research institute for the study of chronic illness and geriatrics are set forth by Dr. Andrew C. Ivy, Vice President of the University of Illinois.

In summarizing the accomplishments in Illinois during the period 1945 to 1947 by state and local officials, private agencies, and interested citizens, the Commission lists as of particular value:

(1) "The State-local co-operative plan for converting the former country 'poorhouses' into adequately staffed and equipped nursing homes for the infirm and chronically ill,
(2) the Illinois Hospital Survey of existing medical and nursing facilities,
(3) the program for licensing private nursing homes,
(4) the development of infirmary facilities in private not-for-profit homes for the aged,
(5) the health survey in the Chicago Cook County area and the survey of chronic disease in Sangamon County,
(6) the development of interest in geriatrics and gerontology on the part of physicians,
(7) the interest displayed by the medical and nursing professions in standards of care in institutions for the chronically ill, and
(8) the genuine interest and concern on the part of the general citizenry that facilities for care be of the highest type, that the best professional services be available to all those afflicted without any stigma or discrimination because of poverty, and that institutional care be provided close to home where the patient and the care given him may be seen by relatives and friends. Only an alert citizenry can keep present and future facilities for the chronically ill from deteriorating into substandard facilities such as the former county 'poorhouses' and some of the present day nursing homes and hospitals for the mentally ill."

Senator T. Mac Downing and his fellow members as well as the professional staff workers are to be congratulated in bringing together cogent facts and observations bearing on the problem of chronic illness with none of the glowing generalities so often found in such communications. This is a valuable social document and should be placed in the hands of all thinking physicians, legislators, professional nurses, and social workers.

FREDERIC D. ZEMAN

SOCIAL WORK IN THE UNITED STATES

SOCIAL WORK YEAR BOOK 1949, Margaret B. Hodges, editor, Russell Sage Foundation, New York, $4.50, 714 pages.

The Social Work Year Book for 1949—the latest in a series of biennial publications of the Russell Sage Foundation—meets the high standards established by its predecessors. It combines most effectively in its description of the social work scene as of 1949, an analysis of past developments, current situations and trends, encyclopedic and bibliographic reference material, and a directory of national social agencies. Each topical article is by an individual author, an expert in his particular field; yet there is

sensed throughout the whole volume a general cohesiveness and breadth of view.

For those interested in the aging and the aged there is an excellent article by Ruth Hill, with a comprehensive picture of the world of the old, pervaded by the warm sympathy which characterizes this author's rare understanding of the human needs of elderly people as individuals. In the entire series it is interesting to observe in many aspects of social work the effects of the population trend with its increasing number of older people—obvious in some instances, barely discernible in others. They all indicate, as Miss Hill so aptly points out, that "social absorption has not caught up with the trend."

However one discovers the aged specifically, if briefly, mentioned in those sections dealing with adult education, the blind, chronic illness, employment, homemakers' services, medical care, mental illness, the several social security measures, personnel, the sectarian social services, public health in general and public health nursing in particular, public relations, public welfare, group work, and recreation.

The omission of any mention of older persons or this population trend in the report on housing, for instance, is equally significant to those who have been for years seeking to have the special needs of this growing group of low income persons in our society accorded at least such attention in planning for housing as their numbers and their economic or social status would seem to suggest was indicated. That this recognized shift in the age composition of the population to a greater proportion of older persons—and consequently in the size and composition of individual family units—is not cited as one of the factors affecting the planning for administration of social agencies, for education for social work, and for family social work, reflects directly the lack of "social absorption" in these three fundamental phases of social work.

The Social Work Year Book, because of rather than in spite of, these omissions, gives us so far as the aged are concerned, confidence in the accuracy of its authoritative close-up of each of the facets of social work in its broadest sense. It is, without doubt, the kind of book which a wise person in any one of the professional disciplines will find to be an essential addition to his collection of valuable source material.

OLLIE A. RANDALL

PSYCHIATRIC STUDY IN SWEDEN

GENETIC-STATISTICAL AND PSYCHIATRIC INVESTIGATIONS OF A WEST SWEDISH POPULATION, Torsten Sjögren, *Acta Psychiatrica et Neurologica, Supplementum 52,* Ejnar Munksgaard, Copenhagen, 1948, 102 pages, paper bound, 15 Danish Crowns.

This is a psychiatric-genetic study conducted on two islands off the west coast of Sweden where the population has been comparatively isolated for centuries and where a corresponding amount of consanguinity exists. There are in these areas what seems to be rather accurate parish records dating back several centuries which enabled the author to go thoroughly into the study of the probands' ancestors. Normal control probands were used in a similar manner, and the official statistics on mental disease and longevity in Sweden as a whole were utilized.

It is impossible to quote the results of this study in detail. Those working in the geriatric field will be interested in the fact that the average expectation of life for a person affected by schizophrenia is estimated to be approximately three-fourths that of a person of the same age in the normal population (this is interesting considering the traditional teaching of certain textbooks that schizophrenics have a higher life expectation than normal average people). "As

regards manic-depressive psychosis, there is a certain although inconsiderable excess mortality and in the case of senile and presenile psychoses, a considerable excess mortality as compared with the normal population." It is also noteworthy that the life expectation of the feeble-minded is 75 to 80 per cent that of the normal population.

The larger part of this study is concerned with problems which are not related to gerontology. However, it is refreshing to read a monograph on a subject dealing with constitutional factors in which such extremely careful and tedious mathematical methods are used, considering the fact that at present so much purely speculative thinking is being done along these lines. There is no doubt that a generation ago in the psychiatric field the endogenous and hereditary factors were extremely over-emphasized as compared to psychogenic and reactive factors. However, during the last few decades the scales have tipped and now we are in danger of neglecting completely the study of constitutional and endogenous elements in psychologic reaction types. From this point of view scientifically careful studies like the present ones are extremely valuable.

KARL STERN

BOOKS RECEIVED

Books received since January 1, 1949, are acknowledged in the following list. Insofar as space and time permit, some will be selected for review in a later issue, but it is unlikely that all will be reviewed.

How to Control Your Handicaps, by Marie Beynon Ray, Bobbs-Merrill Co., Indianapolis, 1948, 327 pages, $3.00.

Proceedings of the National Conference of Social Work, 1948 Columbia University Press, New York, 1949, 498 pages, $6.00.

Social Work Year Book, 1949, Margaret B. Hodges, editor, Russell Sage Foundation, New York, 714 pages, $4.50. (Reviewed in this issue, page 171.)

INDEX TO CURRENT PERIODICAL LITERATURE

It is difficult to cover all journals and list all papers concerned with aging and the aged. Authors and publishers are requested to call attention to publications or send reprints.—Editor.

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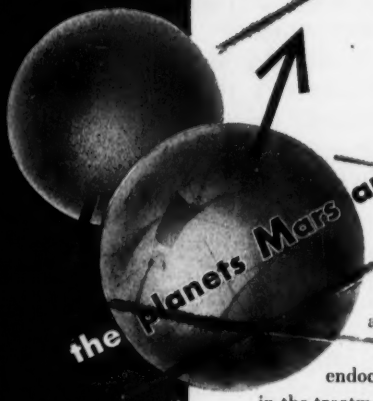

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